

THE ECONOMICS OF 1960

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THE NATIONAL INCOME, 1924-1931

NATIONAL INCOME AND OUTLAY

A CRITIQUE OF RUSSIAN STATISTICS

THE CONDITIONS OF ECONOMIC PROGRESS

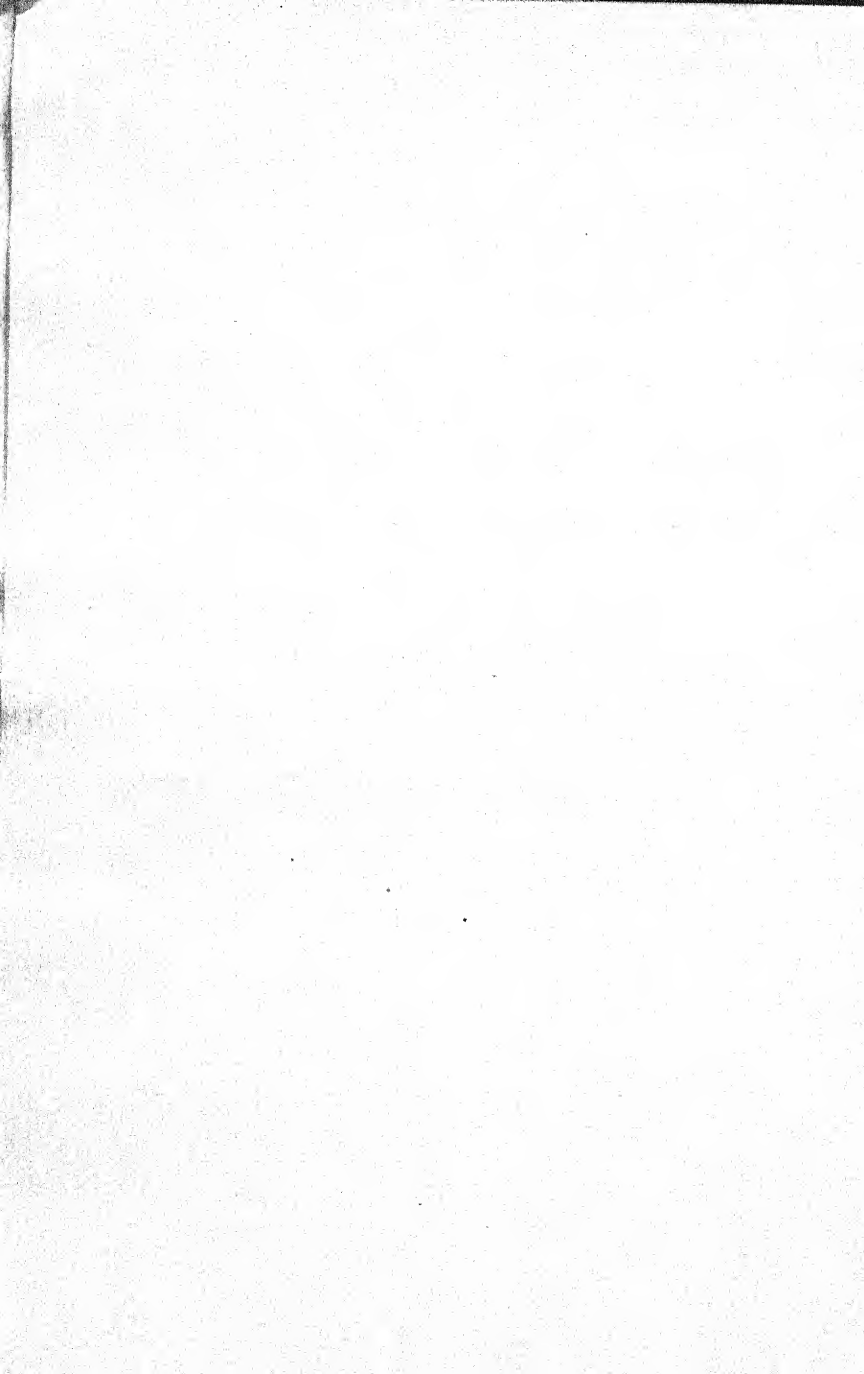
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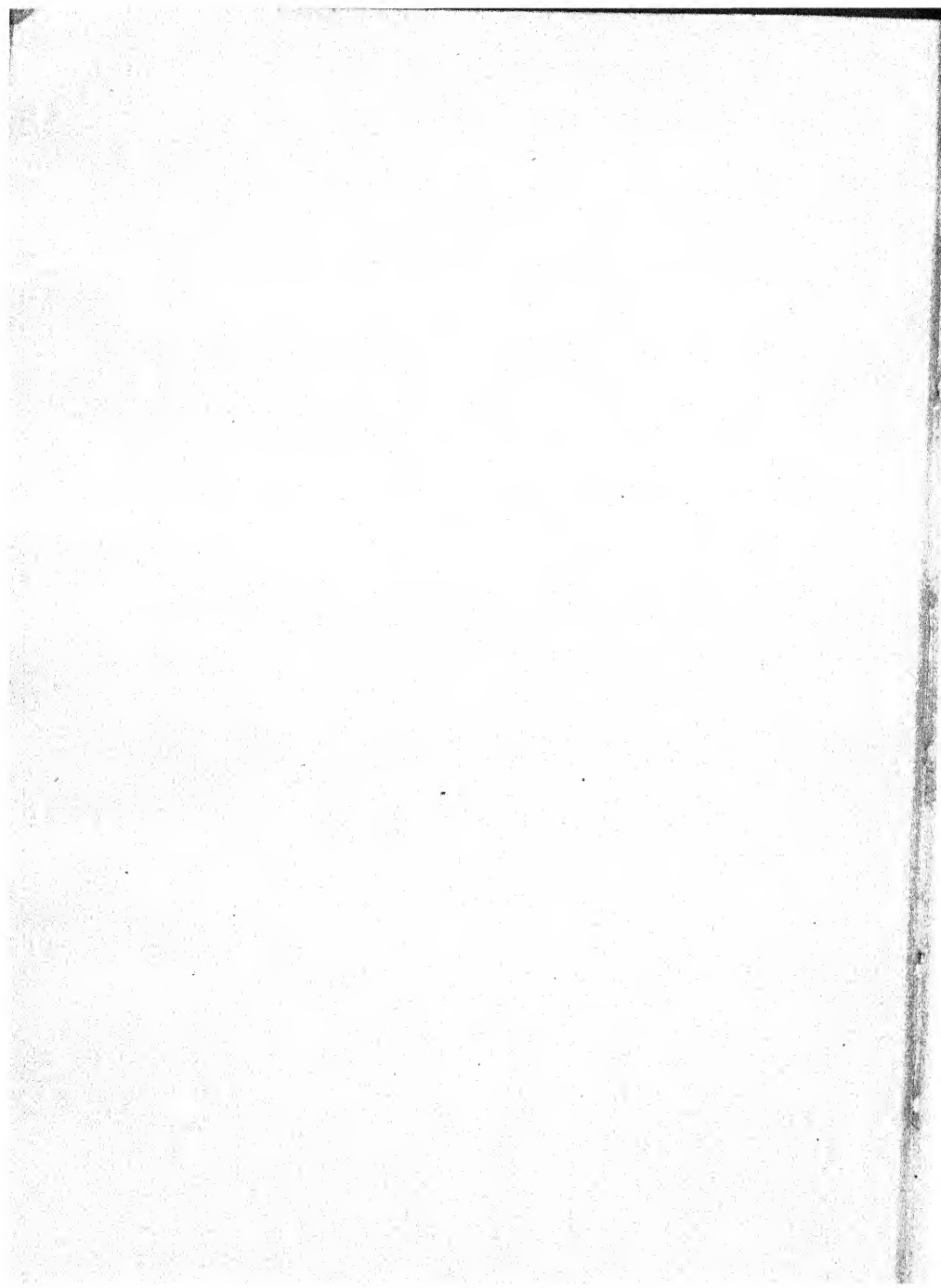
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DEDICATED TO
PAUL H. DOUGLAS
PROFESSOR OF ECONOMICS
AND
CITY COUNCILLOR OF CHICAGO
ON WHOSE WORK
I HAVE FREELY DRAWN



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INTRODUCTION

THE spice of danger gives to mountain-climbing a peculiar thrill which is absent from other recreations, however arduous. In the same way it is the more adventurous prophet who prophesies about a period sufficiently close at hand for him to have a reasonable chance of still being on this earth to see his prophecies fulfilled or confounded, while the less adventurous prophet confines himself to periods which he will not be here to see. The probability that the present writer will still be here in 1960 is (according to the Australian life tables) 0.79, and he realises the risks that he is running.

Nevertheless, this venture was undertaken both feet on the ground. The genesis of this book lay in the Author's realisation that he, like all other practitioners of applied economics, was continually having to take steps which involved estimates of the economic situation at dates far into the future. Confronted by this predicament, one has a natural tendency to assume that trends which have been in existence during the recent past will persist into the future. In many cases it can be shown that policies based on such assumptions are almost sure to be wrong. In this book an attempt is made to deduce, by fuller analysis, the most probable course of world populations, industrial development, prices, capital movements and interest rates over the next twenty years.

For data the Author has made considerable use of his work dealing with national incomes and related data, published last year under the title *Conditions of Economic Progress* (Macmillan) (referred to henceforward as *C.E.P.*). The present work is, as it were, a sequel to it.

Some may ask whether it is worth while, at this stage of the war, attempting to forecast the future.

Presumptive equilibrium will not depend on the outcome of the war. Others may ask whether it is worth while in view of the great changes in social structure which may be pending. It is worth while, for the reason that long-period world economic equilibria develop themselves in their own peculiar manner, entirely independently of political and social changes. Economics — fortunately — is not everything, and the political and social prospects which turn upon this war's outcome are probably a matter of greater concern to the human race than are the economic prospects. It is just that the two are in different fields.

On the other hand, in the decisions which will have to be taken on the tumultuous economic affairs of the war and post-war years, it will be useful to have some idea of the sort of equilibrium towards which it appears that the world will ultimately move.

My thanks are due to Miss M. N. Smart for typing and checking the work, and to Miss G. I. L. Campbell-Brown for drawing the diagrams.

COLIN CLARK

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BRISBANE, AUSTRALIA
15th May 1941

KEEP TOMORROW DARK

The players listen very carefully and respectfully to all that the clever men have to say about what is to happen in the next generation. The players then wait until all the clever men are dead, and bury them nicely. Then they go and do something else. . . . The way the prophets of the twentieth century went to work was thus. They took something or other that was certainly going on in their time, and then said that it would go on more and more until something extraordinary happened. And very often they added that in some odd place that extraordinary thing had happened, and that it showed the signs of the times. . . . "Just as," said Dr. Pellkins, in a fine passage, — "just as when we see a pig in a litter larger than the other pigs, we know that by an unalterable law of the Inscrutable it will some day be larger than an elephant, — just as we know, when we see weeds and dandelions growing more and more thickly in a garden, that they must, in spite of all our efforts, grow taller than the chimney-pots and swallow the house from sight, so we know and reverently acknowledge, that when any power in human politics has shown for any period of time any considerable activity, it will go on until it reaches the sky."

In an ironical form, through the words of this legendary pedant, we apprehend those principles of Dynamic Equilibrium, by the use of which we may hope to unravel something of the economic future.

This book is not indeed a prophecy. It has the more modest and attainable aim of describing not what will happen, but only what state of economic

The effects on this diagram of the great depression of the early 1930's are almost invisible. This depression was a failure to employ the available working population, not a failure of productivity on the part of those who were in work. The widespread disorganisation of that period produced a slight temporary setback to the curve in U.S.A., Britain and Germany, but this had been overcome and the old trend resumed in each case by 1935. In other countries not even a slight movement was noticeable.

What is more surprising, and more significant, is the comparatively slight and temporary effect of the war of 1914-18. These effects had all disappeared, and the pre-war trend resumed by about 1922 in U.S.A., Britain, France and Australia. In Sweden and Japan the disturbances were still slighter. In Germany the war was followed by the still worse disorganisation of the inflation which culminated in 1923. But even here the old trend had been resumed by 1926. Even in Russia where war, revolution, civil war and famine acting in combination had by 1921 reduced real production per head to not much more than one-third of what it had been in 1913; where the so-called "Five-Year Plan" and compulsory collectivisation of agriculture between 1928 and 1933 caused a further reduction in real income; yet still the old trend of growth had been recovered by 1937.

It would be a fairly simple matter to extend each of these trend lines to 1960 and obtain an estimate of real income per head at that date. Such a procedure probably would give us a fairly valuable result, but will not in fact be used. These general productivities will be subdivided into productivities per head in primary,

estimate by the Swedish Ministry of Finance, showing a national income of between 11 and 12 milliard kroner for that year.
JAPAN.—National income figures for 1935 and 1936 as given by Mr. Kaya required to be raised by 8 and 20 per cent respectively to agree with figures calculated from tax yields (*East Asia Economic News*, vol. i, No. 3). Calculation for 1939 is based on figure of 26 milliard yen given by *Mitsubishi Economic Research Bureau Monthly Circular*, January 1940.

secondary and tertiary industries, and account will be taken of the equilibria which determine the proportions of the working populations engaged in these three types of industry.

However, from these undifferentiated data of real income per worker we can draw one very important conclusion, namely, the tendency towards convergence. Countries which at present have a low income per head show the most rapid rates of increase. Sweden has risen rapidly to overtake France and Germany. Japan is rising still more rapidly, and if the present trend is continued will overtake the European countries in some twenty years' time. Britain is rising only parallel to the U.S.A., not overtaking, but the rise shows some signs of accelerating. Russia is an exception to this generalisation, as its expansion, whether under Czarism or Bolshevism, has been very slow. But in this case peculiar difficulties of pressure of population on natural resources prevail.

CHAPTER II

POPULATION AND WORKING POPULATION

FORECASTING of population for twenty years ahead is a matter that presents comparatively little difficulty. The greater proportion of those who will constitute the world's population in 1960 are already on earth at the present time. We require to estimate :

- (1) The probable number of survivors from the present population in each country.
- (2) The anticipated number of births, and the survivors from them.
- (3) The net emigration or immigration, and the reproduction and mortality of the migrants.

As is seen in the tables which follow, the world is divided up into thirty-four subdivisions, showing separately all the principal countries, with the smaller units grouped. Boundaries are taken in each case as they were in 1937, except that Austria, the Saar, Memel and Danzig are included with Germany. The Argentine and Uruguay, which have reached an advanced stage of economic development, are taken as one unit, and the whole of the Rest of America, other than Canada and the United States, is taken as another. The figures for U.S.A. exclude outlying possessions. "Baltic States" includes Latvia, Esthonia and Lithuania, and "Balkans" includes Roumania, Bulgaria, Yugoslavia, Greece and Albania. Turkey is included with Asia. The Canaries and Madeira are included with Spain, and the Azores with Portugal. China includes Korea and Formosa, where conditions are very similar to those in China, and Hong-Kong and other colonies in China. India includes Ceylon, Nepal, Bhutan and French and Portuguese Territories. Japan includes Sakhalin. "South-

Eastern Asia" includes Thailand, Malaya, Indo-China and the Philippines. "The Islands" includes the whole of the East Indies other than Java, New Guinea, and Oceania other than Australia and New Zealand. "Western Asia" covers from Turkey to Afghanistan. Africa is taken as a single unit.

The study of population and of vital statistics owes a tremendous debt to the systematisation, during recent years, of natality statistics by Dr. R. R. Kuczynski, and of vital statistics in general by the editor of the *League of Nations Year Book*. These authorities are the source of the data which follow.

In computing the potential survivors from present-day populations, we require to know :

- (1) The distribution of the population into age groups at some recent date.
- (2) The present rate of mortality in each age group.
- (3) The trend of mortality in each age group.

Of the above, satisfactory data for all the principal countries on (1) and (2) have been collected by the League of Nations. There is no need to take up space here in reprinting the age composition and mortality statistics which are taken from the *League of Nations Year Book*, 1938-39. The age compositions are taken from the most recent data there given. No data are available for Africa or Asia (other than Japan and India), and in their cases rough forecasts of population are made by another method. Information is not available for Argentine and Uruguay, which are assumed to have an age composition, mortality and mortality trend similar to that of the white population in South Africa. For the Balkan States the age compositions referred to different dates and they are all adjusted to the end of 1933, an estimate being made for Albania. The mean of mortality rates for Greece and Bulgaria is assumed to be applicable to the whole Balkan area. Of the Baltic States, figures for Lithuania are not available, and it is assumed that the Lithuanian population will

move in proportion to the Polish. Age composition and mortality for Spain are taken as for Portugal, and for Belgium and Luxemburg as for France. The age composition of Latin America is estimated from the figures for Chile, Mexico, Honduras and Porto Rico. For the mortality and mortality trend, Chilian figures are used, being the only ones available. Neither age composition, mortality nor mortality trends are available for Soviet Russia at the time of writing. It is assumed that Balkan mortality and mortality trends will apply. The total population in January 1939 is known from the Census, and its age composition is estimated on the assumption that Bulgarian mortality and fertility rates have been applicable during the interval since the last Census in 1926.

Mortality trends for the principal countries were estimated by plotting, on a logarithmic scale, data for each age group over the last thirty years and extrapolating. In nearly every country this indicated a substantial decline in mortality rates in all the younger age groups, but a virtual stability of mortality rates in the higher age groups.

The table on p. 9 shows the anticipated percentage decline over the next period of twenty years. Where it is left blank the mortality rates are considered to be stable.

Some of these anticipated movements may appear irregular, but account must be taken of the fact that mortality rates in some countries show much greater scope for reduction than in others.

For computing the number of births the gross reproduction rate must be forecast. For most purposes the net reproduction rate is a more interesting and significant figure, but in this calculation, as we already have full data for mortality, the gross reproduction rate is required.

The gross reproduction rate is defined as the number of female children born to the average woman over her entire lifetime between the ages of 15 and 50. Thus,

ANTICIPATED PERCENTAGE DECLINE IN SPECIFIC MORTALITY RATES DURING 20 YEARS

		Under 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
U.S.A.	{M. {F.	39 38	38 39	20 15	33 23	33 25	22 31	36 29	35 26	9	11	11	11	..	..
Canada	{F.	21	29	15	21	26	32	24	16	16	37	29	31	..	..
South Africa (Whites)	{M. {F.	20 23	15 14	16 5	17 6	29 9	35 3	31 12	21 6	25	19	23	..	..	..
Chile	{M. {F.	25 29	13 30	5 20	7 16	16 9	..	8	6	8	4	..	..	..	..
Great Britain	{M. {F.	29 24	36 67	29 27	16 33	28 26	12 27	12 28	18 34	16 30	5	..	19	18	..
France	{M. {F.	24 40	68 54	39 18	33 31	26 31	28 49	27 36	34 30	30	27	24	28	28	..
Germany	{M. {F.	44 55	54 47	18 ..	31 ..	31 22	41 30	49 14	15 52	..	33	20	8	13	..
Italy	{M. {F.	58 19	46 42	..	..	22 20	30 23	39 16	34	34	25	24	..	..	..
Balkans	{M. {F.	8 20	60 42	65 42	53 37	38 30	32 35	40 37	48 34	15	..	..	..	..	..
Holland	{M. {F.	10 41	60 39	65 50	53 31	30 34	46 47	53 47	55 33	58	35	25	39	8	..
Poland	{M. {F.	40 73	42 73	50 31	31 38	34 36	34 36	47 41	40 35	44	32	34	21	15	..
Portugal	{M. {F.	55 8	55 60	31 65	57 62	33 57	31 36	47 36	33 40	37	31	21	18	17	..
India	{M. {F.	25 29	68 23	52 20	40 26	32 32	41 47	36 53	44 55	44	45	24	26	..	..
Japan	{M. {F.	35 37	21 36	18 26	26 27	10 8	13 ..	13 20	20	60	44	43	39	16	..
Australia	{M. {F.	20 21	7 30	11 14	6 9	18 5	20 ..	26 ..	25	21	..	26	15	17	..
New Zealand	{M. {F.	30 11	10 18	14 ..	9 6	5 12	5 14	4 15	6 13	6	5	11	12	18	..
		25	18	11	..	18	15	15	11	4	7	2	3	..	..

when we allow for a certain mortality among the children, we see that the gross reproduction rate must be greater than 1 to provide for the maintenance of the population.

Not more than two or three years ago it was customary to anticipate a continuing decline in the fertility of the white races to an almost indefinite level. Data for recent years, however, make it clear that there has been, in nearly every country, a marked reversal of the downward trend. The great wave of contraceptive propaganda which swept over the world during the last generation now appears to have come up against something stronger than itself. Somewhere round about the year 1935 seems to have marked the turning of the tide, and in the majority of countries gross and net reproduction rates are now substantially increasing.

Figures for 1940 in Great Britain and Sweden appear to show an acceleration of the increase under war-time conditions. Paradox, even if out of place in economics, is certainly at home in demography.

In the light of the above, the estimates shown on p. 12 are made of gross reproduction rates up to 1960.

For India no statistics of births by age of mother are available and the gross reproduction rate must therefore be computed indirectly. Japanese births by age of mother are available for 1937, and the Japanese age composition can be estimated for that year. We thus obtain for Japan specific fertility rates for each age group and a gross reproduction rate of 2.02. If these Japanese specific fertility rates are applied to the Indian age tables of February 1931 and February 1936, they give crude birth-rates of 31.6 and 31.5 respectively. For the three-year periods centred at these two dates the crude birth-rate for the registration area of India averaged 34.6 and 34.8 respectively. From the ratio between these results it is computed that the gross reproduction rate in India during recent years has been between 2.20 and 2.25.

In Spain the effects of the civil war were allowed for by reducing by 25 per cent the anticipated births over

GROSS REPRODUCTION RATES

	About 1900	About 1910	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	Number of Births in 1939 compared with Last Year shown in above Table
U.S.A. . . . .	..	1.68	1.58	..	1.36	..	..	1.29	1.24	1.24	1.19	..	1.11	..	1.04	..	..	0.99	..	0.98	1.01	..	Fell 1.6 per cent
Canada . . . .	..	..	..	..	..	..	..	..	1.65	..	..	..	..	1.55	..	..	..	..	..	1.23	1.28	..	Stationary
Chile . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	2.26	..	..	..	..	..	..	..	..	..
South Africa .	..	..	..	..	..	..	..	..	1.72	1.69	1.62	1.64	1.65	1.58	1.48	1.43	..	..	1.44	1.48	1.48	..	Rose 3.5 per cent
(Whites) . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
England and Wales	1.73	1.47	..	1.33	1.21	1.18	1.12	1.09	1.06	0.99	0.99	0.96	0.96	0.93	0.90	0.85	0.87	0.87	..	..	..	..	..
Scotland . . .	..	..	..	1.55	..	..	..	..	..	..	..	..	..	1.18	..	..	1.10	..	..	..	1.07	..	Fell 1.9 per cent
Norway	2.06	1.85	1.66	1.63	..	..	..	..	1.33	1.27	..	..	..	1.04	..	0.94	..	0.88	0.87	0.89	0.91	..	Rose 3.5 "
Sweden	1.88	1.69	..	1.41	1.28	1.22	1.17	1.12	1.07	1.01	1.00	0.94	0.94	0.90	0.88	0.82	0.82	0.81	0.84	0.85	..	..	Rose 7.2 "
Denmark . . .	1.95	1.67	1.52	..	..	1.38	..	..	..	..	1.17	..	..	1.07	1.07	1.01	1.04	1.03	1.04	1.06	1.06	1.04	..
Finland	2.14	1.72	1.57	..	..	..	..	..	1.40	..	..	..	..	1.21	..	1.10	..	..	..	1.12	1.18	..	..
France	1.39	1.23	..	1.23	..	..	..	..	1.15	..	..	1.10	..	1.10	..	1.03	1.05	1.00	1.00	..	..	..	..
Spain . . . . .	..	..	..	..	..	..	..	..	..	..	..	1.75	..	1.87	..	..	..	..	..	..	..	..	..
Portugal . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	1.43	..	..	..	1.26	1.26	1.24	..	..	Fell 3 per cent
Holland . . . .	..	..	..	..	..	..	..	1.12	..	..	..	0.97	..	0.86	..	0.82	0.98	..	1.07	..	..	..	Rose 6.3 "
Germany . . .	2.13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Rose 10 "
Switzerland . .	..	..	..	..	..	..	..	..	..	..	..	..	..	1.58	0.96	..	..	0.90	..	..	0.87	0.88	Rose 8 per cent
Italy . . . . .	..	..	..	2.00	..	..	..	..	..	..	..	..	..	..	..	..	..	1.44	1.43	..	..	..	..
Estonia and Latvia	..	..	..	..	..	..	..	..	..	..	..	..	1.04	..	..	..	..	0.96	..	1.09	1.15	..	..
Poland . . . .	..	..	..	2.24	2.21	2.12	1.96	1.98	1.85	1.95	..	1.87	1.87	1.72	1.62	1.12	1.04	..	..	..	..	..	Rose 9 per cent
Czechoslovakia	..	..	..	1.66	..	1.58	..	..	..	1.31	..	..	1.21	..	..	..	..	..	..	..	..	..	..
Hungary . . .	2.60	2.40	1.83	1.83	..	..	..	..	..	..	..	..	..	1.36	..	..	1.24	1.20	1.17	1.10	1.23	..	Fell 5.3 per cent
Bulgaria . . .	3.24	..	2.73	2.73	..	..	..	..	..	2.21	..	..	..	1.86	..	..	..	1.70	1.06	1.07	1.07	..	Fell 16.4 "
Australia . . .	1.68	..	1.52	..	..	..	..	..	..	..	..	..	..	..	..	1.05	1.03	1.03	1.04	1.07	1.07	1.11	..
New Zealand .	..	1.54	1.44	..	..	..	..	..	1.33	..	..	..	..	..	..	..	1.03	..	1.04	1.07	1.11	1.16	..
Japan . . . . .	..	..	..	..	..	..	..	2.51	..	..	..	..	2.30	..	..	..	..	..	..	2.15	..	..	..

the period 1935-40 and by 5 per cent the total number of males between 20 and 39 in 1940.

Regarding the greater war now in progress, one of the most surprising features has been the comparatively

ASSUMED REPRODUCTION RATES

<i>Assumed Constant Gross Reproduction Rates—</i>	1960		
U.S.A.		1.05	
Canada		1.20	
Argentine and Uruguay		1.00	
Great Britain		0.90	
Northern Ireland		1.10	
Eire		1.40	
Norway		0.90	
Sweden		0.90	
Denmark		1.15	
Finland		1.15	
France		1.10	
Belgium		1.10	
Holland		1.15	
Germany and Austria		1.15	
Switzerland		0.90	
Latvia and Esthonia		1.17	
Czechoslovakia		1.10	
Hungary		1.20	
Australia		1.20	
New Zealand		1.20	
<i>Assumed Declining Rates—</i>	1940	1950	1960
Latin America	2.00	1.80	1.70
Spain and Portugal	1.68	1.64	1.60
Italy	1.38	1.34	1.30
Poland and Lithuania	1.34	1.22	1.19
Balkans and U.S.S.R.	1.56	1.40	1.33
Japan	1.92	1.69	1.64
India	2.19	2.03	1.88

small loss of life. Furthermore, owing to the fact that hitherto there have not been large armies of men serving away from their homes, the number of births appears to have been maintained. The *Metropolitan Life Assurance Co. (New York) Monthly Bulletin* (December 1940 and January 1941) estimates military deaths so far, including the Russo-Finnish war, at 300,000 as compared with 7,000,000 in the war of 1914-18. Civilian deaths, on the other hand, are estimated at 215,000 as against 100,000 in the whole of the last war. The Company also estimates that the combined effect of air raids and increased mortality rates raised the 1940 deaths in Great Britain to 120,000 above the 1939 figure.

No sort of estimate of war losses is yet possible at the present stage of the war, and no account is therefore taken of them in these calculations. If substantial war losses are incurred, the population figures for the countries concerned must be revised.

In the case of China we have no fertility or mortality rates or age composition, or crude rate of natural increase, or even a good estimate of the size of the population. For a number of years the League of Nations has maintained its estimate of the Chinese population at 450 millions, and this population is taken for the beginning of 1930 as a starting-point.

For the period since 1930, an estimate has been made of the rate of natural increase of 5 per 1000 per annum.¹ Professor Buck, in *Land Utilisation in China*, finds a crude birth-rate of 38.3 and a crude death-rate of 27.1, but considers that the crude death-rate is understated and should be over 30. This roughly confirms the previous estimate.

Professor Buck also gives tables showing the age and sex composition of samples of the Chinese population, but indicates that there is probably an incompleteness of recording of females, particularly those under 20. The sex ratio is 1.08 males per female as against 1.06 in India, the next highest recorded. Interpreting these

¹ Bloch, *Pacific Affairs*, June 1939.

highly imperfect data as well as possible, the Chinese population appears to have a gross reproduction rate of about 2.6 and probably a long-period rate of natural increase, under undisturbed conditions, of 1 per cent per annum.

It is assumed that the Chinese population increased at the rate of $\frac{1}{2}$ per cent per annum from the beginning of 1930 to the outbreak of the Sino-Japanese War in the middle of 1937. From that date it is assumed to remain stationary till 1943, and thence to increase at the rate of 1 per cent per annum. Korea, Formosa and the small colonial territories on the Chinese coast had a population of 32.7 millions at the end of 1938, and their population is assumed to increase at the rate of 2 per cent per annum.

For other Asiatic and African countries, a crude rate of natural increase of 2 per cent per annum is taken. The actual rate of increase, since 1930, on the basis of the best available estimates has been 2 per cent per annum in Asia and 2.2 per cent in Africa. The following are the recorded rates of increase per cent per annum for some individual countries :

Manchuria, 1931-39	. . . 4.5	Turkey, 1927-35	. . . 2.3
Java, 1920-30	. . . 1.7	Philippines, 1903-34	. . . 1.7
Ceylon, 1900-30	. . . 1.4	Egypt, 1917-27	. . . 1.1
Formosa, 1920-30	. . . 2.3	Algiers, 1901-31	. . . 1.1

The Arabs of Palestine¹ have a gross reproduction rate of 3.33 and a net reproduction rate of 1.88, *i.e.* a rate of natural increase of 88 per cent per generation or about 3 per cent per annum. These figures appear to constitute a world record, as the high Manchurian figure includes a large proportion of immigrants.

The discovery of a technique for calculating anticipated 1960 populations involves a certain amount of patience and ingenuity, but does not involve considerations of any particular significance. The population is taken in quinquennial age groups and the estimate carried forward five years at a time by the use of extrapolated mortality rates. Mortality rates are considered

¹ Hinden, *Sociological Review*, January and April 1940.

to be stationary above certain ages, and in this area the present-day survivorship tables can be used. In using the extrapolated gross reproduction rates as shown in the table on p. 11, it is assumed that the specific fertility rates in the different age groups continue to bear to each other the same proportionate relationship as they do at present. This assumption is not strictly justified, as there is some evidence that in a number of countries the tendency is for a rapid fall in fertility below the age of 20 and above the age of 30, with little or no fall in specific fertilities between the ages of 20 and 30. At this stage, however, it is not possible to take this factor into account.

Where specific fertilities were not available, estimates were made on the basis of countries whose conditions were similar.

It is assumed that the more or less complete cessation of migration during recent years was only temporary and that in the future migration will be resumed on a fairly substantial scale. It is necessary for the purposes of calculation to assume some date at which this migration will be resumed, and the date taken is the beginning of 1943.

On the face of it, there does not appear to be much positive evidence for believing that migration will be resumed. The conclusions reached in the course of these investigations, however, will show very positive reasons for this expectation.

In estimating the probable amount of migration account is taken of the maximum rate of net migration shown during previous periods. Immigration and emigration figures throughout the world are notoriously defective, but satisfactory calculations of net migration can be made, over inter-censal periods, by comparing population changes with recorded natural increase. The difference must accurately represent net migration. This calculation has been made for a number of countries, for the period since 1870, in a useful table published in the Italian *Annuario Statistico* (1939).

NET IMMIGRATION (+) OR EMIGRATION (-) PER ANNUM EXPRESSED AS PER CENT
OF POPULATION AT BEGINNING OF PERIOD

	1870-80	1880-90	1890-1900	1900-10	1910-20	1920-30	1930-35
Italy	- 0.135	- 0.035	- 0.383	- 0.509	- 0.118	- 0.274	- 0.151
Belgium	..	..	- 0.040	+ 0.019	- 0.308	- 0.188	..
Bulgaria	..	..	+ 0.067	- 0.382	..	+ 0.200	- 0.128
Denmark	- 0.200	- 0.370	- 0.191	- 0.318 - 0.194	- 0.132 + 0.122	(1920-26) - 0.170	(1930-34) + 0.170
Eire	- 1.265	- 1.540	- 1.140	- 0.810	- 0.860	..	- 0.560
Finland	+ 0.050	+ 0.050	+ 0.060	+ 0.080	(1911-26) 0	+ 0.050	(1926-36) - 0.051
France	+ 0.140	+ 0.027	+ 0.101	+ 0.056	..	+ 0.574 + 0.408	..
Germany	- 0.192	- 0.293	- 0.072	- 0.019	..	- 0.053	..
Latvia	..	..	..	..	..	(1925-33) + 2.400 0	0
Holland	- 0.043	- 0.177	- 0.183	- 0.167	..	+ 0.018	..
England and Wales	- 0.072	- 0.231	- 0.023	- 0.154	+ 0.072	- 0.044	..
Scotland	- 0.276	- 0.581	- 0.133	- 0.568	..	- 0.801	..
Northern Ireland	- 1.170	- 1.080	- 0.548	- 0.530	..	- 0.572	..
Spain	..	..	- 0.082	- 0.233	..	(1911-26) - 0.009	- 0.420
Sweden	+ 0.592	- 0.343	+ 0.219	+ 0.249	+ 0.036	+ 0.185	..
Switzerland	- 0.086	- 0.380	+ 0.212	+ 0.240	+ 0.479	- 0.152	+ 0.312
Canada	..	..	..	+ 1.830	- 0.315	+ 0.300	..
Australia*	..	..	..	+ 0.110	+ 0.460	+ 0.570	..
U.S.A.*	..	..	..	..	+ 0.900	+ 0.300	- 0.030
					(1910-14)		- 0.010

* The figures for Australia and the U.S.A. are not shown in *Anuario Statistico*. The figures for the U.S.A. cannot be calculated in the usual manner owing to deficiencies of birth and death statistics, but represent the balance of admissions and departures of aliens which are fully recorded from 1910.

Maximum percentage rates of emigration are seen to be 1.5 per cent in Ireland, 0.8 per cent in Scotland, 0.5 per cent in Italy and 0.4 per cent in the Balkans. The maximum rate of immigration of 1.8 per cent is found in Canada under the peculiar conditions of the period 1900-10. The U.S.A. had a rate of inflow of 0.9 per cent between 1910 and 1914. The next highest maxima were shown by Australia and France at 0.6 per cent. The anticipated amount of net migration for the period 1943-60, in absolute numbers per annum, is as follows :

ANTICIPATED IMMIGRATION AND EMIGRATION, 1943-60

	000's Per Annum
<i>Emigrants from—</i>	
Great Britain	93
Northern Ireland . . .	6
Eire	15
Germany	41
Holland	15
Italy	240
Balkans	385
Poland	160
Lithuania	12
Czechoslovakia	25
U.S.S.R.	400
Hungary	20
<i>Immigrants to—</i>	
France and Belgium . .	50
Sweden	33
Switzerland	7
U.S.A.	500
Canada	100
Australia	80
New Zealand	18
Argentine and Uruguay .	175
Rest of America	449

In the case of Australia and New Zealand and the Argentine, these rates represent a rate of inflow, compared with the existing population, of about 1 per cent per annum, a high rate in the light of previous experience. For the U.S.A. the rate assumed is approximately one-third per cent only. Assumed rates of immigration and of emigration for other countries take into account the maximum rates which have so far been recorded at any previous time for that or similar countries, and other considerations.

It is assumed that there will be no migration from or to Africa or Asia. Past figures show that such migration is inappreciable in comparison with these continents' populations.

The age and sex distribution of the migrants is estimated on the basis of Australian and Canadian figures as follows :

Age	Percentage	Distribution
	Males	Females
0	2.5	2
5	3.5	3.5
10	4.5	3.5
15	9	4
20	11	6.5
25	12	6
30	7	4.5
35	4.5	3.5
40	2.5	2.5
45	2	1.5
50	1	1
55	1	1

It is assumed that migrants immediately become subject to the same mortality and fertility rates as those of their adopted countries.

The working population in each country is known at the date of the last Census, which was generally about 1930, and comparable figures of working population

have been obtained for all countries for the beginning of the year 1930 by small proportionate adjustments based on the movements to total population (see table below). There are very wide differences between different countries in the methods of census recording of women members of farm households, and to secure comparability all women recorded as occupied in agriculture are excluded throughout.

For all the principal countries figures can be obtained showing the ratio of occupied to total population in each age group. It would be a mistake, however, to assume that these ratios will persist in the future. As average income rises, the proportions occupied in the 10-14 and 15-19 age groups rapidly fall, as do the proportions of women of all ages seeking occupation. Some estimate of the level and trend of real income must be taken into account in estimating the future ratios of occupied to total population in any given age group. The following table, relating employability in each age group to average real income per bread-winner, is used in computing the probable occupied population in each country in 1960. Over the range of real incomes up to 1500 I.U. per year, the table was constructed by examining the ratios of occupied to total population in U.S.A. (Censuses of 1930, 1920 and 1910), Canada, Australia, New Zealand, England, France, Germany and Italy. Above that range use is made of the calculations of elasticity of labour supply in each age group, made by Professor Douglas and Mr. Schoenberg.¹ By examination of the numbers occupied in each age group in a number of different cities in the U.S.A., together with figures of the average level of wages and retail prices in those cities, they were able to deduce the proportionate change in labour supply from each age group consequent upon a given proportionate change in real income. The weighted average elasticity of labour supply obtained from this geographical analysis agrees very closely with the value for this elasticity previously obtained by Professor

¹ *Journal of Political Economy*, February 1937, p. 59.

PERCENTAGE OCCUPIED IN EACH AGE GROUP

	Actual							Assumed for Various Levels of Average Real Income Per Occupied Person							
	U.S.A., 1980	Canada, 1931	New Zealand, 1926	Australia, 1933	England and Wales, 1931	France, 1931	Germany, 1933	400	600	800	1000	1250	1500	2000	2500
<i>Males</i>															
10	4	3	4	3	12	16	7	20	16	12	8	5	3	1	..
15	48	56	74	68	88	83	97	90	90	90	88	67	56	45	33
20	90	93	92	95	97	95	96	96	96	96	95	93	91	89	88
25	97	98	93	97	98	98	98	98	98	98	98	97	97	97	97
30	98	98	93	98	99	98	97	98	98	98	98	98	98	98	98
35	98	98	94	97	98	97	97	98	98	98	98	98	98	98	98
40	98	98	94	96	98	97	96	98	98	98	97	97	97	97	97
45	97	98	92	96	98	96	94	98	98	97	97	97	96	96	96
50	96	96	89	94	98	94	92	97	96	96	96	95	95	95	95
55	93	94	86	92	94	89	83	95	95	95	95	94	94	93	91
60	87	88	79	83	87	81	55	87	87	87	87	87	87	86	84
65	76	75	70	48	65	72	45	75	75	75	75	75	75	72	68
70	57	58	59	33	42	60	35	60	60	60	60	60	60	57	55
75	40	35	45	20	27	46	21	35	35	35	35	35	35	30	26
80	15	10	20	8	10	31	8	20	20	20	20	20	20	18	15
<i>Females</i>															
10	1	..	2	2	10	12	2	15	13	11	9	5	..	..	..
15	25	24	46	44	73	57	57	65	60	55	45	35	25	23	21
20	42	42	46	49	68	48	49	50	50	50	50	46	42	42	42
25	31	30	30	30	43	37	36	40	40	40	36	33	30	27	24
30	24	15	17	20	30	39	25	35	33	31	30	25	20	18	16
35	23	13	16	17	25	33	23	30	28	26	24	21	18	15	13
40	22	13	15	16	23	26	20	25	24	23	21	19	17	14	12
45	21	12	14	16	22	31	18	25	24	22	20	18	16	13	10
50	20	12	13	16	20	28	17	24	23	21	19	17	15	12	10
55	17	11	12	15	19	26	15	23	22	20	18	16	14	12	10
60	15	10	10	11	16	22	9	20	18	17	15	13	12	11	9
65	11	9	9	7	12	19	7	13	12	11	10	10	9	7	5
70	8	7	7	5	7	15	5	10	9	8	7	7	6	5	4
75	5	5	4	4	5	9	3	6	5	5	5	5	5	3	1
80	1	1	2	1	1	6	1	2	1	1	1	1	1	1	..

from his historical analysis of fluctuations in the size of the labour force, and hence may be regarded as having objective reality. The range of real income over which Professor Douglas was working corresponds very closely to the range for which his elasticities are used in the table on p. 20.

This method for computing occupied from total population was considered to be applicable to all countries except Africa and Asia (other than India and Japan).

Professor Buck's figures for China show that the occupied population, excluding women working in the farm household, and including a proportion of those in part-time occupations, amounted to about 42 per cent of the whole. For the rest of Asia (other than India and Japan) and for Africa, where a very high rate of natural increase is assumed, only one-third of the population is taken to be occupied.

CHAPTER III

THE TREND OF SECONDARY AND TERTIARY PRODUCTIVITY

COMPOSITE figures of average real income per head can be analysed in two different ways. In the first place we can obtain figures of the average value of production in primary, secondary and tertiary industry¹ per person engaged in those respective industries, in terms of the currency of each country and period, and compare these with the average productivity per head, also expressed in that currency. To make from these money values any deductions about real productivities is, however, only permissible if we can assume that the purchasing power of money over primary, secondary and tertiary products varies similarly as between period and period and between country and country.

The results obtained by this first method will, therefore, not be utilised when it is possible to obtain results by the second method. This second method begins by making international comparisons, for some recent date, of the real quantities of primary and secondary production per person engaged in those industries, and also of average real income per occupied person as a whole. Real quantities of tertiary production per person engaged in that industry can therefore be deduced. For certain countries it is possible to make similar calculations for a number of earlier years. The current figures of real output per head in primary and secondary industry are carried back by use of index numbers of the real volume of primary and secondary production per person engaged

¹ Primary industry includes agricultural, pastoral, forest, fishing and hunting industries. Secondary industry includes manufacture, electric power production, mining, building and construction. Tertiary industry is defined by difference as all other economic activities.

in those industries. Real tertiary production per head is obtained by comparing these with changes in real national income, taken as a whole, per bread-winner.

The real value of primary production per man engaged in primary industry, measured in international units, is given in *C.E.P.* p. 244. These figures relate to 1934-35 and to agricultural and pastoral production only, but it is assumed that they may be taken as applicable over the preceding decade and to all primary production. For U.S.A. and Great Britain, index numbers of real production per head are available for preceding periods.

In the case of secondary production, we have for the U.S.A. data compiled for national income purposes showing the net income produced in manufacturing industries over the period 1925-34, which, when aggregated, give us by definition a result in international units. For other countries the data have to be reduced to international units, and the purchasing power of money over secondary products in different countries varies widely. The method used is a calculation which takes as its starting-point the year 1925, for which date the League of Nations calculated an index of the average level of tariffs on manufactured goods in different countries. It was assumed that these tariff levels corresponded to differences in the average price of manufactured goods between the U.S.A. and the country in question. For subsequent years the real value was computed by use of index numbers of the price, within each country, of manufactured goods. The results are given in *C.E.P.* p. 278.

These results refer to what is generally called "value added" and not to net income produced. "Value added" represents gross production less the cost of materials and fuel, but before we obtain net income, deduction has to be made for depreciation, insurance and a large number of other expenses other than direct material expenses, which must be deducted before we can obtain the net contribution of secondary industry to the national income. Taking the figures of net

national income produced by manufacturing industry as given respectively by Dr. Simon Kuznets and the U.S. Department of Commerce, we find they bear the following percentage relationships to "value added" as shown by manufacturing statistics :

Year	Dr. S. Kuznets	U.S. Department of Commerce
1919	68	..
1921	73	..
1923	68	..
1925	65	..
1927	65	..
1929	65	66
1931	59	55
1933	48	58
1935	..	67
1937	..	68

The ratio falls very low in the depression owing to the comparative fixity of depreciation and similar charges. But apart from this the difference remains comparatively uniform without any strongly marked trend.

Only one other country appears to keep a record of all the non-material costs of manufacturing, namely, New Zealand. The ratio of net income to "value added" has here risen from 68 per cent in 1932 to 72 per cent in 1936.

The "value added" figures, therefore, after being corrected for the different prices of manufactured goods in different countries, were reduced by 30 per cent throughout to allow for depreciation and non-material costs, except in the case of Canada where a 40 per cent allowance is made. In the table quoted from *C.E.P.* some of the figures refer to production per wage worker, and not to production per person engaged in manufacture. Such figures are reduced by a further 10 per cent to allow for the non-wage working population engaged in manufacture.

PRIMARY, SECONDARY AND TERTIARY PRODUCTIVITY, PERIOD 1925-34

(Working Hours Actually Worked)

	Percentage Distribution of Working Population in Work about Middle of Period			Average Real Production Per Head in International Units			
				All Working Population (C.E.P. pp. 40 and 44)	Primary Producers	Secondary Producers	Tertiary Producers (deduced from previous columns)
Canada .	31.7	23.2	45.1	1337	618	1855 *	1578
Eire .	51.5	14.6	33.9	627 †	292 †	811	1059
Estonia .	51.6	24.3	24.1	341	268	484	356
Hungary .	54.1	24.8	21.8	359	250 ‡	492	368
Roumania .	68.0	17.0	15.0	243	200 ‡	425	245
Australia .	21.2	33.4	44.4	980	1524	905	800
India .	65.7	13.5	20.8	198	127 †	246 §	391 §
Japan, 1934 .	50.3	19.5	30.2	408	120	550 ||	795
New Zealand (1934-35) .	27.1	24.2	48.7	1435	2444	1490	840

* Deduction for depreciation, etc., 40 per cent.

† Computed or revised in light of information subsequent to the preparation of the tables in C.E.P.

‡ Estimated from data for similar countries.

§ Both deduced from previous columns. Professor Rao in *National Income of British India* gives data to show that the money value of tertiary production per head exceeds that of secondary production per head by 59 per cent. The purchasing power of the rupee over secondary and tertiary products is assumed to be the same.

|| Of an occupied population of 23.85 millions in 1934, 19.5 per cent, or 4.65 millions, engaged in secondary industry produced a net income of 3850 million yen, equivalent to £457 millions or 26.3 per cent of the sterling value of the national income. The national income of that year is equated to 9740 million I.U., and secondary production, therefore, to 2560 million I.U., or 550 per head. More than half of the 4.65 millions are handicraftsmen not working in factories (C.E.P., pp. 118-125).

The question may be raised whether it is permissible to use index numbers of the volume of manufacturing production per head in order to carry back figures of real income. It might conceivably be the case, for instance, that owing to a greater subdivision of manufacturing processes, the apparent volume of production per worker would rise much more rapidly than their real income produced. However, the following test on the American statistics between 1899 and 1935 shows that this is not the case.

	1899	1909	1919	1921	1923	1925	1927	1929	1931	1933	1935
Index of manufacturing production (Federal Reserve Board and Day)	33	53	72	56	86	90	95	110	74	68	87
Do. multiplied by index of prices of manufactured goods (1926 base)	18.8	37.1	94.0	56.9	85.3	90.5	90.2	104.0	57.0	47.9	71.5
Value of net income produced in manufacture per unit of above (\$ million)											
Income as given by N.I.C.B.	187	176	172	222	197	187	191	191	193	139	..
Income as given by Dr. Kuznets	..	..	..	..	..	..	..	186	170	163	165

The volume of income production per unit of the index of production multiplied by prices certainly fluctuates but does not show any definite upward or downward trend. It therefore appears permissible to use index figures of the volume of production per head to establish, at any rate, the general trend of real income produced.

Years	Percentage Distribution of Working Population			Real Income Produced per 2500 Hours, I.U.		
	Primary	Secondary	Tertiary	Primary (Indexes given in C.E.P. pp. 253, 255)	Secondary (Indexes given in C.E.P. pp. 283, 287, 289, 290)	Tertiary (deduced from previous columns)
U.S.A.—						
1937	25.4	28.8	45.8	701	1852	2765
1925-34	24.0	30.2	45.8	661	1560	2276
1920	26.7	33.2	40.1	547	1050	2275
1910	31.9	31.0	37.1	477	940	2446
1900	37.4	29.0	33.6	483	787	2625
1890	42.6	27.3	30.1	385	746	2340
1880	49.4	25.5	25.1	361	599	2320
1870	53.8	22.6	23.6	258	515	2252
Britain—						
1936	4.9	42.0	53.1	475	815	1775
1925-34	6.4	43.9	49.7	408	651	1738
1924	7.1	47.6	45.3	385	615	1688
1907	8.0	46.0	46.0	376	472	1541
1901	8.4	46.3	45.3	378	446	1463
1891	10.2	43.8	46.0	358	432	1229
1881	11.3	43.9	44.8	324	418	1139
1871	14.1	44.4	41.5	284	349	855
France—						
1925-34	24.5	40.0	35.5	415	584	1115
1861	43.0	38.0	19.0	138 *	161	1015

* Deduced by comparing current value of net output with British, assuming similar price levels to obtain.

tertiary products moved in the same ratio over a long period of time. It is considered permissible to use these results for secondary and tertiary production only because they cover a long period of very rapid growth, and because there is no *prima facie* evidence of any substantial distortion of the relative level of prices of secondary and tertiary products in Sweden over this period.

From the data given above and other trends, the estimated secondary and tertiary production per head in each country in 1960, as given in the table in Chapter V, are computed. These data might, it may be suggested, appear to be less precise than those obtainable by direct extrapolation of real income per head as a whole. But in view of the different levels and varying trends of productivity per head in the three types of industry, it is considered definitely more advisable to break up all the data in this manner, imperfect though the analysis may be.

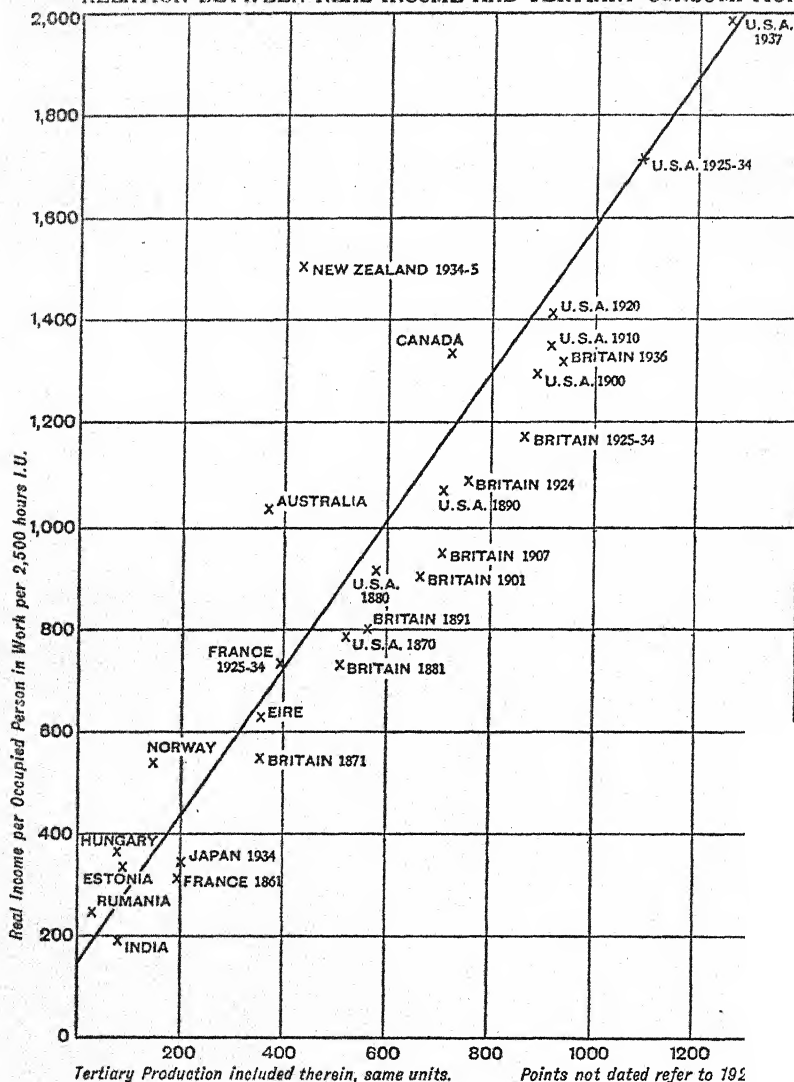
From the data analysed above, one very important result can be obtained. It is a commonplace that with increasing real income per head the demand for tertiary products becomes relatively greater. With few small exceptions (such as international banking services) tertiary products must be produced in the country in which they are consumed. It is of great significance therefore to show, as is done in the diagram on p. 29, the volume of tertiary production, per head of the working population, as compared with real income as a whole, per head of the working population.

If we indicate real income per head by x and tertiary production per head by y , the data appear to be very closely defined, over the whole range of income, by the straight line

$$y = 0.695x - 102,$$

as shown on the diagram. In other words, with increasing real income, the output of tertiary products rises to nearly 70 per cent of the whole real income.

RELATION BETWEEN REAL INCOME AND TERTIARY CONSUMPTION.



This line must not be extrapolated to zero, as that would indicate that countries below a certain level of real income per head have no tertiary producers, which

is clearly not the case. Census records of various countries and times have been searched to find the lowest recorded proportions in tertiary employment. Naturally we would expect to find such figures in primitive countries or at very early dates.

Thailand, 1929	14	Ireland, 1841	15
India, 1931	23	Austria-Hungary, 1869	13
Turkey, 1927	15	Italy, 1871	12
Bulgaria, 1926	15	Russia, 1926	10
U.S.A., 1820	15	Japanese Dependencies, 1930	16
Japan { 1897	15		
{ 1872	10		

It appears from this that we may take it as an absolute minimum that 15 per cent of the working population¹ will be engaged in tertiary industries of various kinds. Figures as low as 10 per cent were recorded in the Russian Census of 1926 and in the first Japanese Census of 1872. There may have been considerable imprecision in these two Censuses, for different reasons.

It may be noted at this stage that in computing the real equivalent of the national income of India and Japan, food consumed by peasant households is valued at the *retail* prices prevailing in more advanced countries. In the above diagram and elsewhere we thus impute into the real national income a considerable amount of tertiary production in the form of transport and distribution of food, apart from the merchandising and other work performed by those actually recorded in the Census as tertiary producers. This point will be dealt with later.

Though the data on the whole lie fairly close to the linear relationship, there are important exceptions. Points markedly to the left of the line (*i.e.* tertiary production less than might have been anticipated from income) are Norway, Canada, Australia and New Zealand, particularly the latter. These are countries which are developing fairly rapidly and also countries of comparatively equal income distribution. Diverging

¹ Working population is defined so as to exclude female members of farm families engaged in farm and domestic work.

to the right of the line, we find particularly Great Britain, a country of mature development and unequal income distribution. Whether the divergences are due to the former or the latter of these factors, or to some other, still remains to be investigated.

It is necessary also to establish the minimum proportion of secondary production.¹ Tertiary production is at a minimum in primitive communities. Secondary production, on the other hand, is at a minimum wherever, under the state of affairs generally described as "The Law of Comparative Costs", primary production is relatively much more efficient than secondary. In the present-day world many countries which have a highly efficient primary production seem to regard this as a drawback and disadvantage and take all possible steps, by means of tariff protection, to withdraw labour from primary production and transfer it to secondary. Whether this is a reasonable policy for them to pursue—justification may be sought in the relatively low world prices of primary products over the last twenty years—is a question which may be left open. But in the future, for reasons which will become apparent, it is expected that the incentives for such artificial transferences of labour to secondary industry will disappear. To throw light on the minimum level of local secondary production which will then still be required in countries with high comparative primary productivity, we may study the experience of those primary producing countries which have not attempted to transfer labour to secondary industry by means of tariffs. Of such countries for which production statistics are at present available, there are two primary producing countries which have not imposed very heavy tariffs to build up secondary production, namely, India and New Zealand. In the case of Eire, the imposition of tariffs has been comparatively recent, and figures for 1926 will provide some indication of the

¹ Secondary production, as here defined, includes building, quarrying, printing and a number of other industries, the nature of whose product restricts them entirely to a local market.

state of affairs under free trade. In Australia the imposition of tariffs has been long-continued and systematic, and a marked transfer of labour to secondary industry has been brought about. Australia, however, is divided up into States which are separated from each other by much greater distances than many nations in other continents, and the tariff-protected industrial development has taken place almost entirely in the Central States. The outlying States are mainly primary producing, with secondary industries only for producing those minimum which need to be produced near the point of consumption, and data for one of these States (Queensland) help to throw some light on our problem.

SECONDARY PRODUCTION (MANUFACTURE, MINING AND BUILDING)
(Expressed in I.U.'s as Percentage of Real National
Income expressed in I.U.'s)

New Zealand	.	.	.	21.5	India	.	.	.	.	17
Queensland	.	.	.	18.5	Eire (1926)	.	.	.	.	17

It is assumed that a minimum of $17\frac{1}{2}$ per cent of the national income must take the form of secondary production. This will include building, the production of certain goods too bulky or perishable for long transportation, processing industries for primary products, and the exploitation of more valuable mineral resources. It is better to express this minimum in terms of quantities rather than of employment, because of the very varying outputs per head shown by the secondary industries of different countries.

CHAPTER IV

THE SUPPLY AND DEMAND OF PRIMARY PRODUCTS

FIGURES of the average real production per male primary producer in the principal countries are calculated in *C.E.P.* p. 244, and on p. 246 a table is given comparing this production per head with the density of settlement on farm land in terms of the number of occupied male primary producers per 1000 hectares of arable and pastoral land. Subsequent calculations on the subject matter of this table have been made as follows :

- (i) Professor Rao's data for India show real production per head of 127 units and a density of 328 males per 1000 hectares of crops, fallow and culturable waste.
- (ii) Densities have been computed for U.S.A. and Canada from statistics of " farms " omitting unenclosed pastures.
- (iii) Data have recently been published for Eire from which can be computed an output per head of 292 I.U. and a density of settlement of 124.
- (iv) The figures for Russia are still affected by the great slaughtering of livestock which took place during the Five-Year Plan. If we go back to production figures of 1927-28 we obtain a real output per head of 112 as against 88.
- (v) Productivities for the Philippines, Syria and Turkey during recent years of 64, 84 and 80 I.U. per person occupied in primary industry respectively as compared with densities of 840, 560 and 480 per 1000 hectares.
- (vi) For Australia, a direct recording of the area of the land owned or leased by settlers gives a density of settlement of only 1.3 per 1000

hectares. Much of the land, however, is not really in effective occupation. In the most densely settled State, namely Victoria, there is a density of 8 per 1000 hectares. Victoria has 24.5 per cent of the Australian working population in primary production, and also exactly 24.5 per cent of the net value of primary production, *i.e.* real output per head is exactly the same in Victoria as in the less densely settled States. For this reason we are entitled to say that the effective density of settlement in Australia is about 8 per 1000 hectares.

If the data of production per head and of density are plotted on a logarithmic diagram (p. 36), they lie, with certain exceptions, round a straight line with a slope of almost exactly -0.5 . The principal exceptions are Russia and China, where production falls far short of what might have been expected from the density of settlement, and New Zealand, Denmark, Holland and Belgium, where production is much higher than might have been expected.

If, however, we are going to claim any widespread validity for this relationship, it is desirable to be able to test it out on an independent set of data. Data are also available for the different regions of the U.S.A., and the results are plotted in italics on the same diagram. They lie very close to the line which had already been drawn from the international data, and appear to provide a good confirmation of the relationship.

These regional density data are computed from official statistics of the farm working population of January 1935, and of the acreage of lands and farms in 1935. The net production is taken from figures computed by Black (American Academy of Political Science, November 1936) relating to 1929 and divided by 1.242 to convert 1929 dollars to international units. (The weighted average for the U.S.A. obtained in this way is 680 units as compared with 661 previously computed.)

	Farm Working Population per 1000 Hectares	Net Production per Head, L.U.
New England . .	41	628
Mid-Atlantic . .	45	691
East North Central .	37	772
West North Central	17	1092
South Atlantic . .	61	490
East South Central .	68	394
West South Central	27	546
Mountain . . .	7	1086
Pacific	21	1102

The diagram overleaf appears to put in a simple arithmetical form our old friend "The Law of Diminishing Returns". If y is equal to output per man and x is density, then—

$$\log y = a - n \log x$$

or

$$y = \frac{A}{x^n},$$

where A is constant.

The fact that n appears to equal exactly half makes the relation very simple, *i.e.* that production per head tends to vary inversely with the square root of the density.

Before substituting the value of n we can compute the marginal from the average product. It has been stated¹ that if the average curve is defined by

$$y = f(x),$$

then the marginal curve will be given by

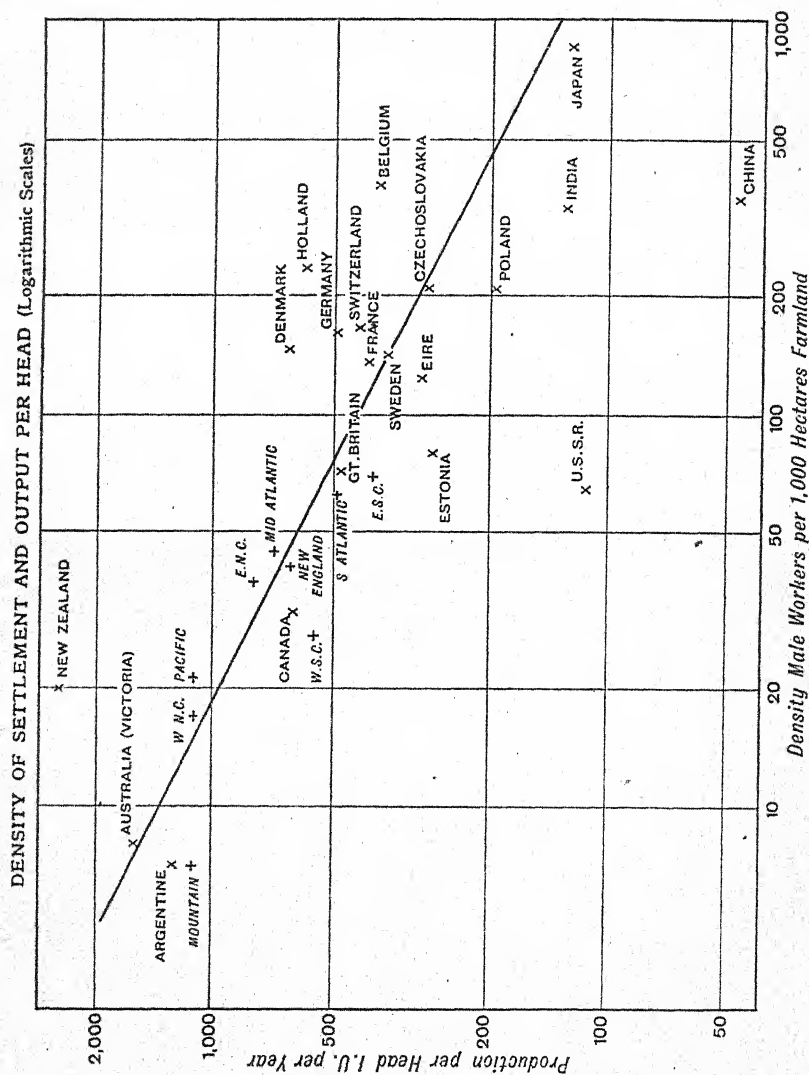
$$y = f(x) + xf'(x),$$

which gives the result that in this case the marginal product will be equal to the average product multiplied by $(1 - n)$.

This again should provide opportunities for testing both theory and observation. In a diminishing returns industry the wage of the agricultural labourer should, in the long period, be more or less adjusted to his marginal productivity, which, according to the above formula,

¹ Robinson, *The Economics of Imperfect Competition*.

should be about half of the average productivity per head of the whole agriculturally occupied population.



If the wage is substantially above this, employers will tend to dispense with labour and the agricultural popula-

tion will fall ; if below, agricultural employers will seek additional labour.

Comparison is made in the table overleaf. In many countries at present, and for a long time past, there has been a sustained and steady outflow of labour from agriculture and, under these circumstances, we should not expect the relationship to hold. In the table an * is marked against each of the cases in which the agricultural population was comparatively stable, and for the average of all these cases the agricultural wage is found to be 51 per cent of the average productivity.

Of particular interest is the comparison for China, where Professor Buck has measured both the average productivity and the annual rate of wages in terms of kilos of grain.

In the last column of the table a comparison is made between the wages of agricultural workers and the average income per head of the whole secondary- and tertiary-producing occupied population. In the U.S.A. and Japan this ratio is as low as 23 per cent, *i.e.* the agricultural worker is receiving only one-quarter of the average income of the industrial population. In both countries, however, there are indications that this situation is not stable, as the outflow from agriculture is rapid. From the study of other countries it may be deduced that the situation is fairly stable when the agricultural worker is receiving something between a third and a half of the average income of secondary and tertiary producers.

In studying the following table, therefore, we may bear in mind what appear to be the controlling equilibria :

- (i) If the datum in the last column is somewhere in the neighbourhood of 40, the agricultural worker will be content to remain in his employment. If substantially below, he will tend to seek other work.
- (ii) However, if the figure in the penultimate column exceeds 50, the farmer will tend to dispense with some of the labour he at present employs, irrespective of the situation revealed in the last column.

	Net Production in National Currency (millions)		Occupied Persons (thousands)		Output per Head (National Currency)		Agricultural Wages as Percentage of—	
	Agriculture	Rest of National Income	Agri- culture	All Other	Agri- culture	All Other	Agricultural Output per Head	Non- Agricultural Output per Head
U.S.A., 1937	6,223	63,594	8,090	35,377	770	1,800	55	23
" 1929	7,263	73,865	7,910	36,949	920	1,998	64	30
" 1920	9,000	63,400	11,100	28,600	811	2,218	96	35
" 1900	3,690	15,650	10,700	16,300	345	960	70	25
" 1870	1,780	5,400	6,900	5,520	257	978	76	20
United Kingdom, 1930	121	3,681	1,166	17,155	104	215	80	39
" 1911	98	1,928	1,500	17,580	65	110	72 *	43
" 1867	140	648	2,060	10,540	68	61.5	48	53
Italy, 1928	30,000	60,000	6,750	8,820	4,450	6,800	58	38
" 1913	7,000	11,200	6,000	7,600	1,166	1,470	42 *	33
France, 1930	191,600	51,400	5,500	12,740	9,380	15,000	83	52
" 1906	20,300	12,300	5,450	11,550	2,330	1,760	34 *	44
" 1860-69	8,300	11,700	6,300	8,700	1,860	954	33 *	65
Australia, 1937-38	187	609	600	2,065	312	294	42 *	44
" 1928-29	189	579	575	1,863	329	315	47 *	49
Japan, 1934	1,670	10,830	7,800	15,700	215	691	75	23
Switzerland, 1929	1,479	9,186	365	1,507	4,050	6,090	50	33
Sweden, 1930	1,052	6,749	697	1,953	1,515	3,455	72	31
India, 1931-32	9,331	6,990	57.6	28.4	162	246	52 *	50
New Zealand	37.3	..	148	..	252	..	58 *	..
Canada	607	..	1,205	..	502	..	69	..
Germany	6,100	..	4,540	..	1,343	..	59 *	..
Poland, 1929	11,000	..	5,148	..	2,145	..	59 *	..
China, about 1930	..	..	..	..	1,393	..	61 *	..

Average of periods indicated *

Notes.—India: Rao, *National Income of British India*, pp. 187, 154.
China: Buck, *Land Utilisation in China*. Output per head and wages expressed in kilos of grain.

51.

Poland: *National Income of Poland*, Birmingham University, 1937.
Germany: *Statistisches Jahrbuch*.
Canada: *Year Book*. Wages from *I.L.O. Year Book*. Other data from *C.E.P.*

Mention has been made of the outflow of occupied population from agriculture, and it is clear that this is likely to continue in certain countries. It is necessary to make some estimate of the maximum rate at which this outflow is likely to proceed, when conditions for entry into secondary and tertiary industries are favourable.

The following table summarises the maximum rates of outflow per annum so far recorded (expressed as percentages of the agricultural occupied population at the beginning of the period). Rates of decline in excess of 1 per cent per annum are not unknown.

MAXIMUM RATES OF ABSOLUTE DECLINE OF POPULATION
OCCUPIED IN AGRICULTURE
(Per Cent Per Annum)

U.S.A. (<i>Monthly Labour Review</i> , Aug. 1939), 1909-14	.	0.4	
" " " " " 1922-29	.	0.2	
" " " " " 1935-38	.	1.2	
Germany, 1925-33	.	0.2	
Great Britain :			
	C.E.P. p. 255	Fussell (<i>Economic Journal</i> , 1924)	Booth (<i>J.R.S.S.</i> , 1886)
1851-61	..	0.3	0.3
1861-71	..	1.2	1.2
1871-81	1.2	0.7	1.1
1881-91	+ 0.3	0.5	..
1891-1901	0.7	0.7	..
1921-31	0.7	..	..
1931-37	1.1	..	..
Switzerland, 1920-30	.	.	1.4
Sweden (agrarian population), 1880-90	.	.	0.4
" (from <i>National Income in Sweden</i>), 1890-1900	.	.	0.5
" " " " 1900-1910	.	.	0.5
" " " " 1910-20	.	.	0.4
" " " " 1920-30	.	.	0.5
Italy, 1921-31	.	.	1.0
France, 1926-31	.	.	1.2
Czechoslovakia, 1921-30	.	.	0.5

(Original Census data unless otherwise indicated.)

It is assumed that between 1930 and 1960 the maximum possible reduction of agriculturally occupied population will be 35 per cent.

Primary production is more influenced than secondary or tertiary production by changes in the numbers engaged therein, but at the same time it has its own upward trend of output per head. We require to estimate the extent of this trend over the period between the data of the figures quoted above (1934-35) and 1960, which trend will be superposed upon any effects resulting from changes in density. This trend is estimated from changes in real production per occupied person over the preceding twenty-five years, since 1910. Satisfactory data of this nature are available for six countries, but for two of them (Great Britain and Japan) it is not permissible to use them because density was declining very rapidly in those countries over that period. For the four other countries where the densities did not change very greatly, the percentage improvements in real primary production per head over the last twenty-five years were : Australia, 23 per cent ; U.S.A., 39 per cent ; Sweden, 49 per cent ; and Germany, 19 per cent. The mean of these figures, namely 32.5 per cent, is taken as a measure of the probable upward trend in the next twenty-five years.

The demand for tertiary products, it has been shown above, is almost in linear relation with real income per head. It is also possible to establish a relationship between the demand for primary products and real income. In the case of primary products, however, we cannot neglect the effect of variations in relative prices, or the terms of trade between primary products on the one hand and secondary and tertiary products on the other. It is not necessary to make this allowance in the case of tertiary products :

- (1) Because their relative price movements are generally much less marked than in the case of primary products.
- (2) In most communities tertiary consumption forms

a large fraction of real income compared with primary consumption, *i.e.* a rise in the price of tertiary products is, to a large degree, automatically reflected in a change in real income.

The following table has been compiled to show some instances of the variation in food consumption per head as between China — which is probably the lowest in the world — and the wealthiest 10 per cent of the British population — which is about the highest. The heavy fall in cereal consumption as real income improves is particularly interesting.

FOOD CONSUMPTION *
(Kilos per Head per Annum)

	China	Germany	Great Britain	
			Poorest, 10 per cent	Richest, 10 per cent
Cereals and flour (expressed as grain)	228.0	149.0	97.0	89.0
Potatoes	26.0	150.0	78.0	80.0
Legumes	19.3	2.3	..	..
Green vegetables	63.5	50.3	23.6	50.1
Fruit	6.6	42.5	23.7	61.9
Sugar	1.1	24.0	32.6	49.7
Beef and veal	0.5	17.1	15.5	27.9
Pork and bacon	4.4	27.6	18.6	45.0
Other meat	0.6	4.5		
Fish	1.0	12.2	3.9	19.9
Eggs	1.1	7.1	4.5	13.4
Milk . . . .	..	123.0	54.8	177.3
Butter . . . .	..	8.9	4.4	16.2
Other fats	1.3	17.0	10.6	7.1
Cheese . . . .	..	5.4	2.7	3.8
Value of diet (wholesale prices, I.U.)	16.0	49.3	32.8	78.9

* Sources: Buck, *Land Utilisation in China*; Statistisches Reichsamt: Orr, *Food, Health and Income*.

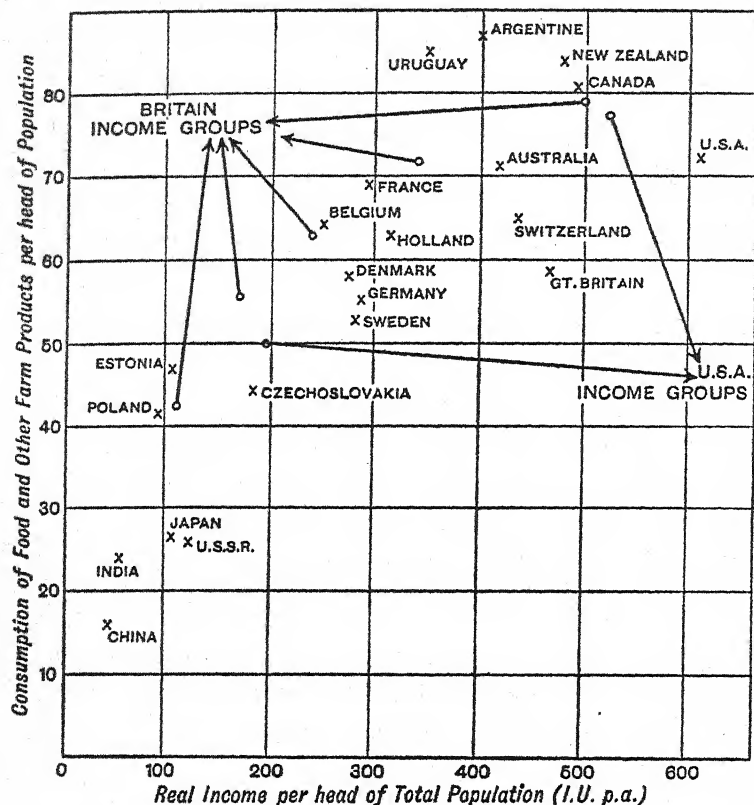
Consumption per head of primary products, including non-edible products such as cotton and tobacco, is given for the principal countries in *C.E.P.* p. 249. A table is

also given showing the value in I.U. per head per year of food consumed by six different income categories in the British population. These income levels can be re-expressed in terms of I.U. instead of British currency.

Data are also available for the U.S.A., on a less precise basis (*America's Capacity to Consume*, pp. 87-88). The population is divided into six income categories, the lowest of which includes 40 per cent of the population, and the highest only 0.6 per cent of the population. Aggregate incomes and aggregate food expenditure are given approximately for these groups and can be converted into I.U.'s. The income data, referring to the year 1929, are multiplied by a factor of 0.926. The food data are first multiplied by a factor of 0.482 to convert the retail values to farm values, and then by 0.805 to convert the farm values to I.U.'s. The high figure for the very small top group need not be taken at face value, as it probably represents a small volume of food purchased through very expensive retail channels.

Income Classes	Population, millions	Food Expenditure, \$ million	Aggregate Incomes, \$ million	Average Food Expenditure, \$ per Head	Average Income per Head, \$	Food Expenditure per Head at Farm Values, I.U.	Incomes per Head, I.U.
I	0.73	400	18,300	550	25,100	212	23,250
II	2.19	700	8,700	320	3,975	124	3,680
III	7.17	1,900	12,900	265	1,800	103	1,668
IV	16.60	3,800	17,500	230	1,055	89	977
V	43.40	7,600	24,600	175	568	68	526
VI	51.40	5,400	10,900	105	211	41	195
TOTAL	121.50	19,800	92,900	163	764	63	707

The statistics of Chinese food consumption are from the nutrition tables in Professor Buck's *Land Utilisation in China*. Only a very small addition need be made for consumption of non-food primary products. The figures for Indian food consumption were given by Professor Rao in *Sankhya*, vol. iv, Part 2, and indicate an aggregate of 6823 million I.U., or 24 per head. (These figures refer to British India excluding Native States, and include non-edible products.)



Taking into account the consumption in the highest income ranges (not shown in the diagram), the data appear to lie about a parabola which is fitted from the following data :

	Consumption (y)	Income (x)
China	16	47
Mean of all countries with average incomes between 200-500	69	368
Higher American incomes	120	1668

giving $y = 6.9 + 0.1971x - 0.0000781x^2$.

It will be noticed that the average data for Great Britain and the U.S.A. lie well to the right of the parabola and also to the right of the curves indicating consumption in the individual income groups in those countries. There is nothing surprising about this. When a substantial fraction of a large national income is concentrated in the hands of comparatively few people food consumption is bound to be much less than it would be if the whole population were each in fact possessed of their "average" income.

The parabola as fitted cannot describe the data over the whole range. It reaches a maximum at a point where income per head is about 1200 I.U. (income per occupied person 3000 to 4000 I.U.). But so small a proportion of the population enjoys such an income, even in the wealthiest countries, that this deficiency is not at present of any practical importance.

These data refer to the period 1925-34 except for the American and British data by income groups (1929 and 1934 respectively), India (1931-32) and China (about 1930). The data should therefore be fairly homogeneous regarding the effect of changing terms of trade on the consumption of primary produce. It will be noticed, however, in this regard, that in the Argentine and Uruguay, where food prices are low relative to the prices of manufactured goods, consumption is high relative to real income, while consumption is low in Switzerland where food prices are artificially high (though possibly the position of the Swiss datum may also be explained by the same causes as the British and American).

It is not possible to determine the price elasticity of demand from comparison of food consumption between countries, but a fairly clear relationship can be established from year-to-year movements in U.S.A. and Great Britain. In Britain a satisfactory index showing aggregate money value of retail sales of foodstuffs is available for the period 1929-39, which is deflated by the Retail Food Prices Index. The year-to-year movements of the

GREAT BRITAIN

Year	Real Income per Head of Whole Population	Value of Food Consumption (Retail Sales Index ÷ Prices) *	Do. per Head of Population *	Primary Consumption ÷ Expected per Head from Real Income per Head, I.U.	Board of Trade Food Prices (Wholesale)	General Prices *	General Prices excluding Wholesale Prices of Food *	Terms of Trade *	Food Consumption ÷ Expected Primary Consumption *
1929	505	1144	25.0	86.4	115.0	4197	3241	355	289.5
1930	502	1205	26.3	86.1	100.0	4096	3264	306	305.5
1931	455	1279	27.7	80.2	88.5	3933	3197	277	345.0
1932	451	1308	28.3	79.8	87.7	3888	3158	278	355.0
1933	503	1285	27.6	86.2	82.9	3787	3097	268	320.0
1934	520	1297	27.7	88.4	85.0	3798	3091	275	314.0
1935	540	1363	29.1	90.4	86.8	3830	3108	279	322.0
1936	571	1413	30.0	93.9	91.7	3899	3135	293	319.5
1937	595	1443	30.6	96.7	102.2	4088	3237	316	316.5
1938	586	1499	31.6	95.7	97.3	4134	3325	292	330.0
1939	610	1573	33.0	98.4	91.5	4106	3345	273	335.5

* Arbitrary units.

U.S.A.

Year	Farm Income Ex. Subsidies, \$ md.	Net Imports of Farm Products, \$ md.	Consumption of Farm Products, \$ md.	Prices of Farm Products (1909-14 Base)	Real Consumption of Farm Products *	Real National Income less Real Consumption of Farm Products, I.U. md.	Money Income less Money Income of Farm Products, \$ md.	Prices (Non-Farm) *	Terms of Trade (Farm Prices ÷ Non-Farm) *	Real National Income on 2500 Hours per Annum Basis, I.U. md.	Do. per Head, I.U.	Consumption of Farm Products Expected from Real Income per Head in I.U. per Annum	Real Consumption per Head of Farm Products, I.U.	Do. as per cent of Expected
1925	12.80	0.56	13.36	156	8.57	60.63	63.14	104.2	1498	66.6	580	95.0	74.6	78.5
1926	12.38	0.30	12.68	145	8.75	64.05	68.52	106.9	1357	70.2	605	97.8	75.1	76.9
1927	12.44	0.30	12.74	139	9.18	63.13	66.46	105.1	1321	70.0	591	96.2	77.6	80.6
1928	12.82	0.27	13.09	149	8.79	67.41	69.11	102.6	1452	74.1	619	98.4	73.3	74.5
1929	12.79	0.35	13.14	146	9.01	69.99	72.26	103.2	1413	76.3	628	100.5	74.1	73.7
1930	10.34	0.10	10.44	126	8.30	62.40	64.46	103.3	1218	68.9	560	92.8	67.4	72.6
1931	7.40	0.06	7.46	87	8.58	50.62	50.44	99.4	876	57.9	466	82.0	69.1	84.3
1932	5.56	0.01	5.57	65	8.58	37.42	35.83	95.8	679	45.1	361	67.6	68.6	101.3
1933	6.27	0.05	6.32	70	9.04	39.26	34.88	88.9	788	47.7	380	70.5	71.8	101.8
1934	7.18	0.26	7.44	90	8.26	47.94	42.36	88.4	1019	59.3	469	82.3	65.3	79.4
1935	8.11	0.37	8.48	108	7.85	52.25	46.52	89.0	1213	63.5	506	86.5	61.5	71.1
1936	9.38	0.80	10.18	114	8.93	59.27	54.02	91.1	1252	72.0	560	92.8	69.5	74.9
1937	10.06	0.26	10.32	121	8.54	62.86	59.78	95.1	1272	75.3	582	95.2	66.0	69.3
1938	8.81	0	8.81	95	9.27	56.13	53.79	96.0	990	68.0	522	88.6	71.2	80.4

real volume of food consumption can then be compared with those anticipated from changes in real income per head. This relationship is compared with a terms of trade figure obtained by comparing wholesale food prices with a general index number designed to show movements of prices of secondary and tertiary products.

As only relative and not absolute comparisons are sought of the movements of consumption and of the terms of trade, a number of the data are computed in arbitrary units. The relative position of the British and American data on the diagram is also arbitrary.

In the case of U.S.A., food consumption is obtained from the value of farm production and net imports of farm products including (which the British data do not) non-edible products. These consumption figures are reduced to real terms by the wholesale price index number of farm products. An index number of prices of secondary and tertiary products is obtained from the ratio :

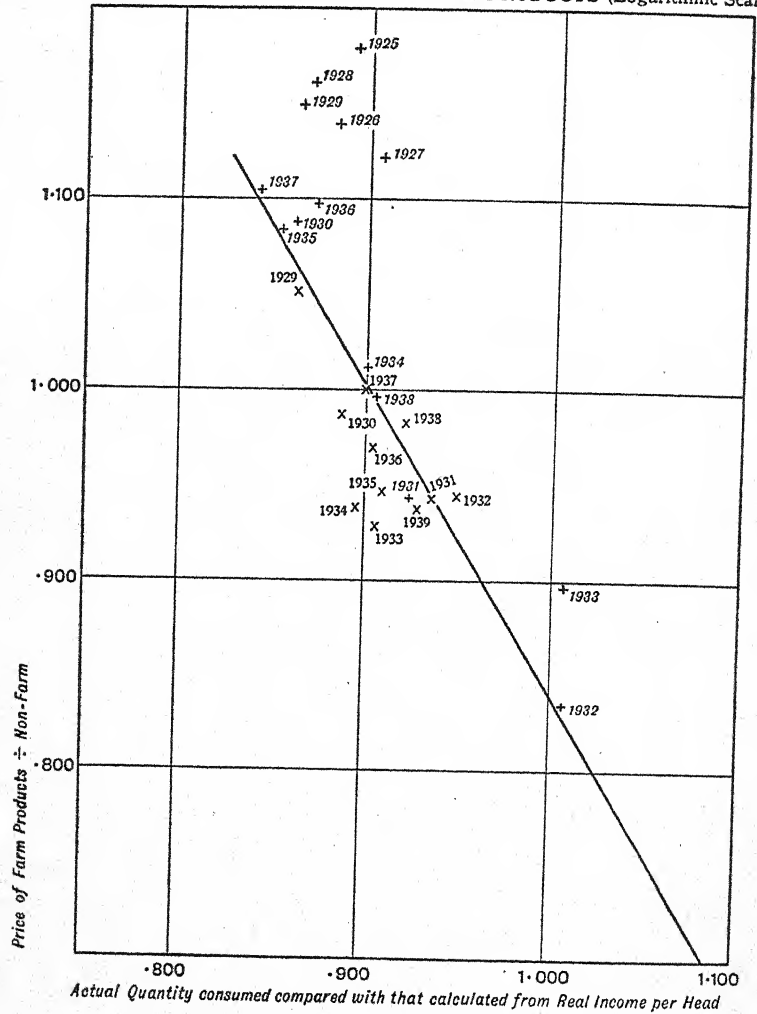
$$\frac{\text{Money National Income} - \text{Money Value of Food Consumption}}{\text{Real National Income} - \text{Real Value of Food Consumption}},$$

and terms of trade computed from this.

On the logarithmic diagram (p. 48) a straight line can be fitted to the data with a slope of 0.625. This is taken to indicate the price elasticity of demand for primary products in response to changes in the terms of trade.

This elasticity is clearly below 1, if only to judge from the simple fact that the aggregate income of primary producers always falls when the terms of trade move against them. It might be contended, from the data shown on the diagram, that the line should have been drawn with a steeper slope, i.e. still lower elasticity. This does not appear to be justified by the data. It is true that the American data for 1925-29 are left well to the right of the line, but it appears that this can be explained in terms of changing habits of consumption. Any alternative hypothesis about the slope of the line would create difficulties much less readily explainable.

PRICE ELASTICITY OF DEMAND FOR FARM PRODUCTS (Logarithmic Scales)

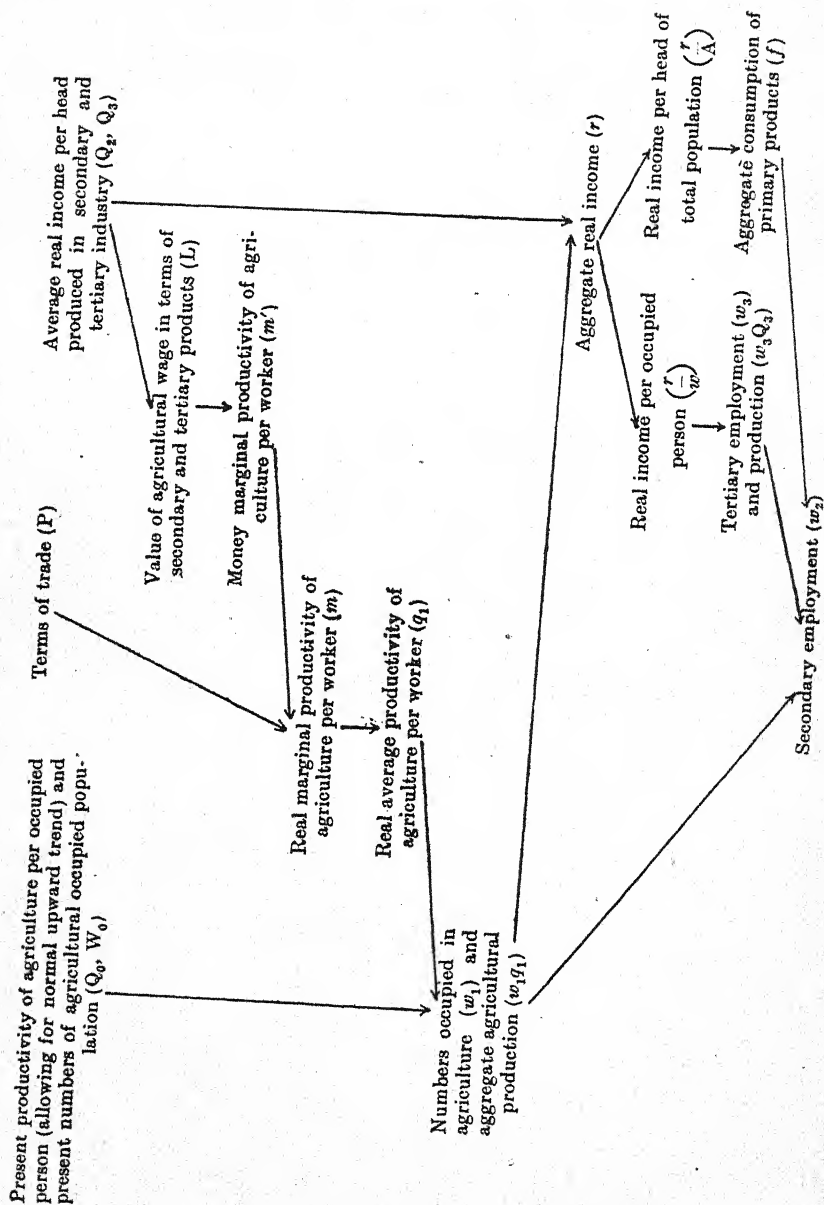


CHAPTER V

WORLD EQUILIBRIUM

WE now have all the necessary basic data for the calculation of the real income of each country in 1960, and the distribution of its occupied population between primary, secondary and tertiary industries, provided we can obtain a figure for the terms of trade, *i.e.* the price of primary produce in terms of secondary and tertiary. As we are taking the period 1925-34 as our base period for prices, the terms of trade will also be measured from this period as a base. In the calculations which follow it is assumed for the sake of convenience that prices of secondary and tertiary products remain as they were in 1925-34, while the prices of primary products move to a new level, P (price in 1925-34 = 1). It should be noticed that this is an assumption of convenience and not a basic assumption. We can assume if we like that the prices of secondary and tertiary products change by a factor n , and primary products by a factor nP , without affecting the argument. There is, however, an implied basic assumption, namely, that there is no change in the terms of trade as between secondary and tertiary products. It is very difficult to say whether a change in the terms of trade as between them has taken place or will take place, as the evidence has never been properly examined. However, we can be fairly sure, at any rate, that the terms of trade between secondary and tertiary products are not subject to such violent fluctuations as are the terms of trade between primary and secondary products.

The causal relationships are as shown in the following diagram. To each parameter is attached the symbol by which it is described in the equations which follow. They refer to 1960 (or to whatever date we are considering



in the future) and not to the present, except for Q_0 and W_0 , indicated as representing present-day data.

The chain of causation is perhaps unexpected, but can be made clear. The original force making for change is the increasing production per occupied person in secondary and tertiary industries. These values are obtained from extrapolation of current data.

This determines the level of agricultural wages. The ratio which they bear to the average of non-agricultural incomes is estimated, according to the circumstances in different countries, at between one-third and one-half approximately.

The level of agricultural wages in the long run determines the marginal productivity of agriculture (not *vice versa*) by determining the expansion or contraction of the industry. The money marginal product must, in the long run, adjust itself to wages. The level of world prices of agricultural products determines what real marginal product corresponds to what money marginal product. In other words, the higher the level of world prices, the greater the expansion of agricultural production possible with a given level of agricultural wages, or

$$\begin{aligned} L &= m' \\ m' &= mP. \end{aligned}$$

We have shown above that the marginal productivity of agriculture is, generally speaking, half of the average productivity, or

$$q_1 = \frac{L}{0.5P}.$$

The present real productivity per occupied person in agriculture, increased by $32\frac{1}{2}$ per cent to allow for its natural upward trend, is defined as Q_0 , and the present numbers engaged as W_0 . For a given country and time, productivity varies inversely with the square root of density, so we have

$$\frac{w_1}{W_0} = \left(\frac{Q_0}{q_1} \right)^2.$$

From these data the numbers occupied in agriculture, their average production per head, and aggregate agricultural production, can be computed for each country for any given level of the terms of trade, as is done for four assumed values of P in the tables which follow.

The values of w_1 thus calculated are sometimes so high that they clearly conflict with the provision that at least $17\frac{1}{2}$ per cent of real income must be of secondary origin. In these cases no calculation is made and the entry "maximum" written in the table. In other cases (marked with an * in the table) the result obtained is so low that it conflicts with the provision that the decline in the agricultural population between now and 1960 should not be more than 35 per cent. In these cases a decline of 35 per cent only is allowed for.

So far we have computed the national and world production of agricultural products for any given level of the terms of trade. To obtain each country's demand for primary produce we must go further and compute its whole real income. This involves also computing the distribution of occupied population between secondary and tertiary employment. From the four possible values of P tried out, it is seen that world supply and demand of primary products will balance at a value of about 1.9. In other words, the terms of trade for primary produce will improve by as much as 90 per cent from the average level of 1925-34.

At first sight it may seem rather hard to accept a movement so violent as this. Consider, however, the two largest factors (amidst a host of smaller factors) determining this result. The first is the rapid industrialisation (even though productivity will be low) of Japan and China, and their consequent development as exporters of manufactured goods and importers of primary produce. The other predominant factor is the anticipated continuance of the rapid growth of output per head in the U.S.A. These two large-scale events within themselves constitute a world industrial revolution.

Now evidence is available from that epoch at the beginning of the nineteenth century, which present-day historians refer to as the Industrial Revolution, as to the effect of that industrialisation on the terms of trade. A full discussion of historical evidence bearing on these matters is given in a later chapter. But we will anticipate so far as to give the main trend for this period. British official records¹ make it possible to calculate the terms of trade between British exports and imports (the former constituting almost entirely manufactures and coal, the latter food and raw materials), for each year of the nineteenth century back to 1801; while records have also been preserved of a special inquiry into the prices of exports and imports in the year 1694. Prices in the first decade of the nineteenth century were violently disturbed by the Napoleonic wars, with the Berlin Decrees and the Orders-in-Council decreeing blockade and counter-blockade,² but we may extract data for 1802-3, the years for which the Peace of Amiens was in force. In the years just after Waterloo the terms of trade fluctuated violently and an average of eight years is given.

TERMS OF TRADE (PRICE OF EXPORTS ÷ PRICE OF IMPORTS)
(On 1913 Basis)

1694	290	1841	86
1802-3	197	1857	76
1815-22	128		

Between Waterloo and the "hungry 'forties" the terms of trade moved in favour of agriculture by a factor of 1.49. Between the Treaty of Amiens and Waterloo they moved further by a factor of 1.54. The sluggish industrial development of the eighteenth century moved them by a factor of 1.47.

If so great an impact on world trade resulted from

¹ For sources see Chapter VII below.

² How like today!

the industrialisation of England and France in the eighteenth and early nineteenth centuries, is it not reasonable to expect a similar impact from the industrialisation of China and Japan in the middle years of the twentieth century?

With this substantial movement of the terms of trade anticipated during the next two decades, there will be a growth of agricultural population, up to the limits imposed by the necessities of local production of secondary and tertiary products, in Africa, Western Asia, The Islands, South America, Australasia and Denmark. On the other hand, the flight from the land will continue with unabated rapidity in Spain, Portugal, Eire, Poland, Russia, Japan and China, even at this much higher level of agricultural prices. This high level of prices will also fail to prevent substantial decreases in agricultural population in Great Britain, the other Scandinavian countries, and France.

When w_1 and q_1 are known, we can determine the numbers engaged in secondary and tertiary industries (w_2 and w_3), aggregate real income (r) and consumption of primary products (f) by the solution of certain equations. In the general case, and excluding certain qualifications which are dealt with later, we have in the first place the relationship between real income per head and demand for tertiary products, which may be stated in the form ¹

$$\frac{w_3 Q_3}{W} = 0.695 \frac{r}{W} - 0.102.$$

Next we have, by definition, analysing the whole occupied population:

$$W = w_1 + w_2 + w_3.$$

¹ The dimensions of the units used in all subsequent equations and tabulations are:

Numbers of persons (W , W_0 , etc.)—millions;

Incomes per head (q_1 , Q_2 , etc.)—thousands of I.U. per annum;
and therefore—

Aggregate incomes (r , f , etc.)—milliard I.U.

We next have the equation relating food consumption per head to real income per head of the whole population¹ when $P = 1$, thus:

$$\frac{f}{A} = -0.0781 \frac{r^2}{A^2} + 0.1971 \frac{r}{A} + 0.0069.$$

When P is not equal to 1, each term on the right-hand side of this equation must be multiplied by a factor $(d)^2$ in order to take into account the elasticity of demand for food in response to changes in its wholesale price.

Finally, we have an equation defining real income (r) in terms of the other parameters. This equation must take account of the fact that the change in the terms of trade will benefit countries with a substantial net export of primary products and reduce the real income of countries with a substantial net import. The equation for real income is thus taken as:

$$\begin{array}{ccccc} \text{Volume of Secondary} & & \text{Consumption} & & \text{A Positive} \\ & \text{and Tertiary} & + & \text{of Primary} & + & \text{or Negative} \\ & \text{Production} & & \text{Produce} & & \text{Allowance.} \end{array}$$

Where the production of primary products exceeds their consumption, this will make available for consumption, in addition to the local production of secondary goods, a further quantity dependent on the size of the export surplus of primary products, and the terms of trade. The reverse holds in the case of an import surplus:

$$r = w_3 Q_3 + w_2 Q_2 + f + (w_1 q_1 - f)P.$$

The above four equations must be solved for the four unknowns (r , f , w_2 and w_3). Elimination gives a quadratic in r :

¹ Whole population (not working population only) defined as A . It will be noted that primary consumption *per head* is related to real income *per head*, while tertiary consumption *per bread-winner* is related to real income *per bread-winner*. This differentiation is not of great importance. It appears to be justified by the nature of the relationships.

² $P=1.5$
 $P=1.9$

$d=0.7762$;
 $d=0.6703$;

$P=1.8$
 $P=2.0$

$d=0.6933$;
 $d=0.6488$.

$$\begin{aligned}
& - \frac{0.0781}{A}(1-P)dr^2 + \left\{ 0.695 \frac{Q_3 - Q_2}{Q_3} + 0.1971(1-P)d - 1 \right\} r \\
& + \left\{ 0.0069A(1-P)d + Pw_1q_1 + (W - w_1)Q_2 \right. \\
& \quad \left. - 0.102W \frac{Q_3 - Q_2}{Q_3} \right\} = 0.
\end{aligned}$$

The workings, which are very lengthy and of no interest, need not be given in full. Having solved this equation, we then also obtain f , w_2 and w_3 as shown in the tables.

In the case of Asia (except Japan) and Africa, an important variation must be made. Data of real income per head in these countries, used above for comparison with their consumption of primary and tertiary products, contain a substantial element of imputed income, as has been already explained, for the transport and distribution of the foodstuffs which are consumed in peasant families. The order of magnitude of the value of these services, on our scale of values, is about the same as the wholesale value of the foodstuffs themselves. In all these countries, therefore, where peasant families produce most of their food requirements, this element of imputed income is taken at

$$\frac{w_1}{W}f,$$

i.e. imputed incomes equal to the food consumption of the primary producers. This element of imputed income must be added to the four other terms in the equation for r .

In the case of Japan and Russia such an equation would be applicable today, but in view of the rapidity of their industrialisation, the first equation is deemed to be applicable to them for 1960. For all the other countries concerned a further allowance has to be made to take account of the fact noted above that the proportion of tertiary workers cannot fall below a minimum of 15 per cent (see below).

We may next examine the equilibrium for countries

such as Australasia, Denmark, South America, etc., where, it appears, the marginal productivity equilibrium would force the number of agricultural workers to such a point as to leave an insufficient number for secondary and tertiary production. (Low income areas in this category such as Africa, Western Asia and The Islands, are dealt with separately.)

These countries must be subdivided into two further classes. The first category includes Australia, New Zealand and South America (other than the Argentine and Uruguay). In these countries there appears to be sufficient unused land for settlement to enable q_1 to be maintained at the level of Q_0 irrespective of the size of w_1 (i.e. to maintain productivity per head irrespective of density). In this case, therefore, we equate q_1 to Q_0 and obtain another quadratic in which

$$-\frac{0.0781}{A}d(1-P)r^2 + [0.1971(1-P)d - 0.13 - PQ_0\psi]r + [0.0069Ad(1-P) + PQ_0W\xi - 0.102W] = 0$$

and

$$w_1 = \xi W - \psi r,$$

$$\text{where } \psi = \frac{0.175}{Q_2} + \frac{0.695}{Q_3} \quad \text{and} \quad \xi = 1 + \frac{0.102}{Q_3}.$$

This result was obtained by introducing a new equation $w_2Q_2 = 0.175r$, i.e. providing that at least $17\frac{1}{2}$ per cent of the real national income should be obtained from secondary production. At the same time w_1 becomes unknown, and we thus have five unknowns and five equations.

The second sub-group includes Denmark, Argentine and Uruguay, Hungary and (at certain levels of prices) the Balkans. In these countries the best land is already fairly fully settled, and so it must be assumed that q_1 will decline as w_1 rises. We have again the relationship for w_2Q_2 as above, and w_1 and q_1 both unknown but connected by the equation

$$\frac{w_1}{W_0} = \left(\frac{Q_0}{q_1}\right)^2,$$

giving six unknowns and six equations. In this case a considerably more complex equation results.

Defining ψ and ξ as above,

$$\begin{aligned} & \frac{0.0781}{A}(1-P)d\psi^{-2}w_1^2 + \psi^{-1}\left\{d(1-P)\left[2\left(-\frac{0.0781}{A}\right)\xi W\psi^{-1}\right.\right. \\ & \quad \left.\left.+ 0.1971\right] - 0.13\right\}w_1 + PQ_0\sqrt{W_0w_1} \\ & - \left\{\xi W\psi^{-1}\left[0.1971(1-P)d - 0.13 - \frac{0.0781}{A}\xi W\psi^{-1}(1-P)d\right]\right. \\ & \quad \left.+ 0.0069A(1-P)d - 0.102W\right\} = 0. \end{aligned}$$

This equation of the fourth degree in w_1 is solved graphically.

In the case of China, India, South-Eastern Asia and Java, where w_1 and q_1 are known, and where we call into play the provision that at least 15 per cent of the occupied population must be engaged in tertiary industries, we have

$$w_3 = 0.15W$$

and w_2 can immediately be deduced. Allowing again for imputed income, we can obtain a quadratic for r —

$$\begin{aligned} & -\frac{0.0781d}{A}\left(1-P+\frac{w_1}{W}\right)r^2 + \left\{0.1971d\left(1-P+\frac{w_1}{W}\right) - 1\right\}r \\ & + \left\{0.15WQ_3 + w_2Q_2 + Pw_1q_1 + 0.0069Ad\left(1-P+\frac{w_1}{W}\right)\right\} = 0. \end{aligned}$$

The same proviso providing a minimum proportion of tertiary workers holds in Africa, Western Asia and The Islands, but in their case w_1 is not known. Here agricultural production will expand up to the limit imposed by secondary and tertiary requirements. There is unused land available, and so q_1 will be equal to Q_0 irrespective of the level of w_1 . In their case it happens also that $Q_2 = Q_3 = 0.2$, and so a simplified procedure can be adopted. We obtain the equation

$$0.825r - 0.03W - PQ_0w_1 - f\left(1-P+\frac{w_1}{W}\right) = 0.$$

Successive values are assumed for r , and values of w_2 and w_1 are deduced from them and tested against the above equation. The solutions are rapidly obtained by this approximation.

This result indicates that equilibrium between supply and demand of primary products will be attained with a value of $P=1.9$. The values of real income, etc., shown in subsequent tables are based upon a preliminary result of $P=1.85$. The difference is not significant and the effect on real income, etc., inappreciable.

A most interesting paradox is that in certain countries the quantity of agricultural production appears to fall with the improving terms of trade. This is the case in South America, the Balkans and Australasia. The reason is that primary producers here constitute a large proportion of the population, and improving terms of trade so increase the farmers' real incomes that there is a substantially increased demand for tertiary products. To meet this demand, when there is no reservoir of secondary workers to draw upon, labour actually has to be diverted from primary production.

The volume of world primary production will increase from 53 milliards in the early 1930's to 83 milliards in 1960, an increase of 56 per cent as against an anticipated increase of world population of 38 per cent.

This equilibrium will involve substantial exports of primary produce from some countries and substantial imports into others. The U.S.A. will become a substantial importing country — this may appear surprising but the trend in this direction has been very marked over the past thirty years. An interesting diagram bringing out this point (p. 62) was published by Professor Pearson in *Farm Economics* (Cornell University, June 1940) showing net exports as a percentage of American farm production falling from 7 per cent in 1898 to -0.8 per cent in 1913 (net importation). After a temporary reversal during 1916-21, the downward trend was resumed, and in 1936 and 1937 the figure stood at -5 per cent. There is every indication that this

	Present Agricultural Occupied Population, W_0 (millions)	Present Agricultural Output per Head $\times 1.325$ Q_0 ($'000$ I.U.)	Assumed Output per Head in ' $'000$ I.U.		Assumed Wage of Agricultural Labour, L (in ' $'000$ I.U. of Purchasing Power over Secondary and Tertiary Products)
			Secondary, Q_2	Tertiary, Q_3	
U.S.A.	9.56	0.88	2.73	2.65	.81
Canada	1.21	0.82	2.73	1.95	.70
Argentine and Uruguay . .	1.32	1.60	1.30	1.90	.40
Rest of America	13.00	0.525	0.90	0.50	.175
Great Britain and Northern Ireland	1.02	0.79	1.445	1.84	.85
Eire	0.54	0.39	1.445	1.16	.50
Norway	0.39	0.35	1.78	1.02	.40
Sweden	0.70	0.47	1.95	1.16	.50
Denmark and Iceland . .	0.46	0.85	1.50	1.10	.40
Finland	0.63	0.35	1.20	1.00	.33
France	4.38	0.55	1.025	1.16	.55
Spain	4.74	0.40	1.025	1.10	.55
Portugal	1.47	0.39	1.025	1.10	.55
Holland	0.53	0.77	1.40	1.20	.60
Belgium-Luxemburg . . .	0.66	0.52	1.025	1.10	.55
Germany-Austria	5.00	0.65	1.40	1.20	.55
Switzerland	0.36	0.57	1.40	1.20	.55
Italy	6.68	0.38	1.025	1.00	.40
Baltic States	1.08	0.36	0.85	0.89	.35
Poland	5.15	0.26	0.85	1.00	.36
Czechoslovakia	1.68	0.38	0.95	1.10	.40
Hungary	1.82	0.38	0.95	1.02	.30
Balkans	9.75	0.30	0.85	0.425	.20
Australia	0.53	2.02	1.60	1.45	.76
New Zealand	0.15	3.24	2.44	1.55	.85
U.S.S.R.	39.80	0.15	0.85	1.00	.24
Japan	8.09	0.16	1.025	0.975	.25
India, Burma, Ceylon, etc. .	76.90	0.17	0.30	0.40	.175
China, Korea, Formosa, etc.	150.40	0.06	0.20	0.20	.075
Western Asia	13.95	0.11	0.20	0.20	.075
S.E. Asia	17.00	0.085	0.20	0.20	.075
Java	12.60	0.085	0.20	0.20	.075
The Islands	7.05	0.19	0.20	0.20	.075
Africa	41.00	0.19	0.20	0.20	.075

* In Rest of America, Australia, New Zealand, Western Asia, The Islands and Africa, q_1 is deemed to be q_0 . In Argentine and Uruguay, Denmark, Hungary and the Balkans q_1 cannot, for reasons given above, be deduced from this formula.

Elsewhere q_1 has been calculated (subject to the provisions for a minimum value of w_1 of 0.65 W_0).

† Where $q_1 = Q_0$, w_1 cannot be deduced from this formula. It is deduced from the alternative formula.

‡ Comparison of L and Q_0 indicates that in these cases the agricultural occupied population will

q_1^*				w_1 deduced from $\frac{w_1}{W_0} = \left(\frac{Q_0}{q_1}\right)^2$ (in millions) †				P=1.8		P=1.9	
P=1.5	P=1.8	P=1.9	P=2	P=1.5	P=1.8	P=1.9	P=2	$w_1 q_1$	f	$w_1 q_1$	f
1.08	0.9001	0.8526	0.81	6.33	9.14	10.18	11.27	8.23	12.86	8.69	12.37
0.93	0.7778	0.7368	0.70	0.94	1.346	1.498	1.66	1.047	1.15	1.104	1.09
..	1.46	1.50	..	..	1.58	1.50	..	2.31	1.57	2.25	1.53
0.525	0.525	0.525	0.525	..	18.45	17.96	..	0.69	5.90	9.43	5.75
0.98	0.9444	0.8947	0.85	0.66	0.714	0.814	0.88	0.674	3.15	0.728	3.03
0.484	0.484	0.484	0.484	0.351‡	0.351‡	0.351‡	0.351‡	0.170	0.162	0.170	0.158
0.434	0.434	0.4211	0.40	0.254‡	0.254‡	0.269	0.30	0.110	0.179	0.113	0.172
0.58	0.5556	0.5263	0.50	0.455‡	0.501	0.558	0.62	0.278	0.44	0.294	0.42
..	0.88	0.89	..	..	0.43	0.42	..	0.38	0.26	0.37	0.25
0.43	0.3667	0.3474	0.33	0.41‡	0.574	0.644	0.71	0.21	0.21	0.224	0.20
0.68	0.6111	0.5790	0.55	2.85‡	3.55	3.95	4.38	2.17	2.27	2.29	2.19
0.496	0.496	0.496	0.496	3.08‡	3.08‡	3.08‡	3.08‡	1.528	1.60	1.528	1.55
0.484	0.484	0.484	0.484	0.955‡	0.955‡	0.955‡	0.955‡	0.462	0.475	0.462	0.455
0.80	0.6667	0.6316	0.60	0.49	0.707	0.788	0.87	0.471	0.60	0.498	0.57
0.65	0.6111	0.5790	0.55	0.43‡	0.478	0.532	0.59	0.292	0.425	0.308	0.42
0.73	0.6111	0.5790	0.55	3.96	5.66	6.30	6.99	3.46	5.05	3.65	4.85
0.71	0.6111	0.5790	0.55	0.234‡	0.313	0.349	0.39	0.191	0.26	0.202	0.23
0.47	0.4444	0.4211	0.40	4.34‡	4.88	5.44	6.02	2.17	2.38	2.29	2.27
0.45	0.3889	0.3684	0.35	0.70‡	0.925	1.033	1.14	0.360	0.275	0.381	0.28
0.322	0.322	0.322	0.322	3.35‡	3.35‡	3.35‡	3.35‡	1.079	1.89	1.079	1.82
0.47	0.4444	0.4211	0.40	1.09‡	1.23	1.37	1.52	0.547	0.83	0.577	0.81
..	0.37	0.38	..	..	1.91	1.85	..	0.71	0.46	0.70	0.45
..	0.2222	0.2252	..	..	17.77	17.27	..	3.95	2.16	3.89	2.13
2.02	2.02	2.02	2.02	..	0.491	0.474	..	0.992	0.69	0.957	0.67
3.24	3.24	3.24	3.24	..	0.072	0.071	..	0.233	0.163	0.230	0.160
0.19	0.19	0.19	0.19	25.90‡	25.90‡	25.90‡	25.90‡	4.92	9.65	4.92	9.29
0.20	0.20	0.20	0.20	5.25‡	5.25‡	5.25‡	5.25‡	1.05	4.34	1.05	4.18
0.21	0.1944	0.1842	0.175	50.00‡	58.80	65.30	72.40	11.43	11.12	12.03	10.72
0.075	0.075	0.075	0.075	97.80‡	97.80‡	97.80‡	97.80‡	7.33	8.19	7.33	7.91
0.10	0.0834	0.0790	0.075	..	19.40	19.30	..	2.03	1.15	2.02	1.12
0.10	0.0834	0.0790	0.075	12.30	17.70	19.70	21.90	1.48	1.10	1.55	1.05
0.10	0.0834	0.0790	0.075	9.10	13.10	14.60	16.20	1.09	0.87	1.15	0.83
0.19	0.19	0.19	0.19	..	7.72	7.66	..	1.47	0.64	1.46	0.63
0.19	0.19	0.19	0.19	..	48.05	47.65	..	8.96	4.13	9.05	3.93
								81.66	86.60	82.975	83.50

to remain constant at the level of Q_1 .

be directly determined from L and P. It is determined, for P=1.8 and P=1.9 only, from the equations

and consequent maximum value of q_1 of $1.24 Q_0$ from the equation $L=0.50 q_1 P$.

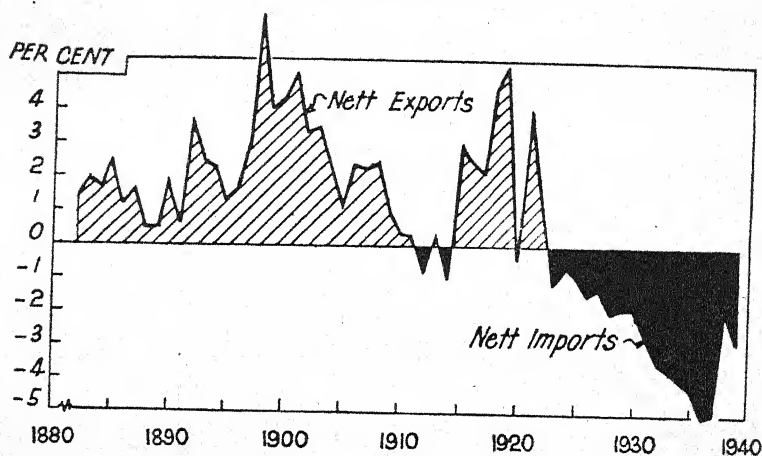
formulae given in the text, for values of P=1.8 and P=1.9 only.

fall at the greatest possible rate — i.e. to 65 per cent of its present level.

strong downward trend will again be resumed after this war.

U.S.A. NET EXPORTS OR IMPORTS OF FARM PRODUCTS AS
PERCENTAGE OF PRODUCTION

(Published by courtesy of Professor Pearson)



What is more surprising is that Russia, if the trend towards industrialisation continues, will also require to import substantial quantities of food.

The following table shows, in milliards of I.U. per annum, the anticipated *net* exports or imports of primary produce from the principal exporting and importing areas when $P=1.9$. The figures in brackets show the net imports or exports per annum in the period 1934-38.

The anticipated volume of world trade in primary produce will increase three and a half fold above recent levels, but it will flow in very different channels. As already indicated, the two largest importing areas will be the U.S.A. and Russia. The U.S.A. is at present the second largest importer of primary produce, but her import requirements will increase more than fourfold. Russia, at present, is virtually not on the market at all. There will also be a great increase of imports in Japan

Principal Exporting Areas			Principal Importing Areas		
Africa	5.15	(0.63)	U.S.S.R.	4.34	(0.01)
Latin America (other than Argentine and Uruguay)	3.67	(1.29)			(ex-ported)
Balkans	1.76	(0.09)	U.S.A.	3.61	(0.94)
India	1.38	(0.51)	Japan	3.12	(0.25)
Argentine and Uruguay .	0.72	(0.62)	Great Britain . . .	2.29	(1.95)
Western Asia	0.90		Germany	1.17	(0.75)
The Islands	0.83		Poland	0.74	(0.01)
S.E. Asia	0.51	(0.80)	China	0.56	(0.17)
Java	0.33				(ex-ported)
Australia	0.28	(0.46)	Czechoslovakia . . .	0.23	(0.08)
Hungary	0.25	(0.03)	Sweden	0.13	(0.05)
Denmark	0.12	(0.16)	Belgium	0.11	(0.21)
Baltic States	0.10	(0.05)	Holland	0.07	(0.04)
New Zealand	0.07	(0.29)	Norway	0.06	(0.04)
Canada	0.02	(0.10)	Spain	0.02	(0.00)
Finland	0.01	(0.02)	Switzerland	0.02	(0.07)
		(im-ported)	Italy	0.01	(0.12)
Eire	0.01	(0.04)	France	0.00	(0.57)
			Portugal	0.00	(0.02)
	16.10	(4.90)		16.50	(4.80)

and a smaller increase in China. The British market will only expand slightly, while France, it is anticipated, will probably cease to import and become self-supporting. Imports will probably also decline in Norway, Switzerland and Belgium.

Among the exporting countries, the great expansion of production will come in certain parts of Asia, Africa, Latin America (other than Argentine and Uruguay) and the Balkans. Among the exporting countries of the present day, it appears that exports from the Argentine and Uruguay will only expand slightly, while in Australia, New Zealand and Denmark they will actually fall. This will be in consequence of the diversion of labour to tertiary industries in these countries, as a result of their high average standard of living, which in turn is caused by (amongst other things) high productivity per head in primary industries and high export prices.

The equating of world supply and demand above has been based on the assumption of freedom of international trade in primary products, or, speaking more

precisely, it is assumed that such restrictions and hindrances as are imposed upon international trade in primary products will not be sufficient to effect any substantial redistribution of productive resources in the restricting country, as compared with the equilibrium distribution of productive resources determined above. It is not necessary to assume, for the purposes of the above calculations, that international trade in secondary products is unrestricted. In the international exchange of one secondary product for another, we may assume any degree of restriction, provided that the adverse effect upon productivity of such restriction is subsumed into our anticipated levels of productivity shown in the table above. In the interchange of secondary products for primary products, we must assume that these restrictions are not substantial enough to cause any important diversion of resources (as between primary, secondary and tertiary production) in the restricting countries.

It is anticipated in some circles that the world in the future will divide itself up into economic regions within which trade will be unrestricted but between which trade will be so restricted as to be almost non-existent. This is a specious proposal which, in reality, has nothing to commend it. But if in fact something like this comes about, it will be seen that, in any possible make-up of such regions, supply and demand of primary products will (judging from the above table) still balance fairly closely within each region. In other words, the terms of trade for primary produce within each of these regions will not be very different from those computed for a world equilibrium.¹ At worst, unless the world is cut up into very large numbers of quite uneconomic units, such a policy can only move the terms of trade above or below the world level to quite a moderate degree.

The data and assumptions have been scrutinised for possible disturbing factors large enough to have any

¹ This, however, is only true for primary produce considered as a whole. For individual primary products, under these circumstances, great variations in price are to be expected.

substantial effect on the result. Probably the most important of these is the possibility of an improvement of agricultural technique in China. Q_0 for China has been placed at only 60 I.U. per head per year, based on a present-day figure of 46. India, which at present has a density similar to that of China, shows an output-per-worker figure nearly three times as high. If we raise Q_0 for China to 90, this will give a value for w_1 (agricultural working population) of 163.6 millions, and China will be a net exporter of foodstuffs. The net effect will be to reduce world prices below the anticipated level by 10 per cent. But this contingency is not considered to be very likely.

There is also an important possibility in the other direction which must not be neglected. The rural worker throughout the world has hitherto been content with half or less than half the wage earned by his industrial counterpart. If, as the result of increasing ease of communications and of uniformity of social customs, the agricultural worker in some of the important producing countries comes to expect a less disproportionate wage, the result will be a further marked rise in world prices of primary products.¹

There may be some who will be reluctant to accept the above conclusions on the grounds of the enormous transfers from primary to secondary industry hypothesized for the populations of Japan, China, India and Russia. Great though they may at first sight appear, they are by no means inordinate when compared with what has already taken place. In Japan the proportion

¹ This would certainly be the case if the economic situation were such as to require a net flow of labour from urban industry to agriculture. But so far in the world's history this flow has nearly always been in the other direction, and probably will so continue. One of the most important reasons for this lies in what seems to be a fundamental dispensation of Nature, namely, that the fertility of rural populations is always higher than that of urban. Were it not for this fact, a flow in the opposite direction would often be necessary, and to evoke this, rates of agricultural wages would be required which would raise world prices of primary products to hitherto unheard-of heights. It almost looks as if Nature, operating through the laws of economics, was doing her hardest to keep food cheap.

of population engaged in primary production fell from 72 per cent in 1897 to 50 per cent in 1930. In Russia a far more rapid transformation is already taking place. The proportion of peasants and agricultural workers to the total population, which was 78 per cent in 1926, had, in the short period of thirteen years, fallen to 46 per cent at the time of the 1939 Census.¹ We need only hypothecate for India and China a rate of transfer somewhere intermediate between that of Russia and that of Japan to reach the conclusions indicated above.

It is of great interest to know the respective price trends of individual primary products, and some provisional calculations have been made in this field. However, these are of such a speculative nature that they are hardly worth reproduction. In essence the method is to obtain supply and demand curves for 1960 and to determine their point of intersection. The supply curve is generally obtained by relating past data of movements of world output of the commodity in question, expressed as a proportion of world agricultural output as a whole, and movements of its world price, also expressed as a proportion of the movements of world agricultural prices as a whole. The demand curve is drawn from two data, a point and a slope. The slope is the average price elasticity of demand for the article, obtained from a number of sources in different countries. The point is a demand computed for 1960 with prices at their present level, demand being computed simply on the strength of changes in real incomes in the consuming countries.

For comparison are given average prices received by American producers in the period 1925-34. The quality or grade for which 1960 prices are stated is intended to be the weighted average of the qualities produced in U.S.A. during the period 1925-34.

It will be noted that the general average of these

¹ 1939 figures, covering workers and dependants, published by *Planovoie Khoziastvo* and quoted by U.S. Department of Labour (*Monthly Labour Review*, December 1940); 1926 figures, proportion of occupied males engaged in agriculture.

PRICES OF PRIMARY PRODUCTS IN AMERICAN CENTS
(Assuming Prices of Secondary and Tertiary Products to
remain at 1925-34 Level)

	Unit of Quantity	Average Price received by American Producers, 1925-34	Antici- pated Price, 1960	World Production (million metric tons)		Range of Probable Error, Per Cent
				Actual, 1935-38	Antici- pated for 1960	
Wheat .	Bushels (60 lb.)	89-00	134-00	120-80	900-0	± 15
Rye .	Bushels (56 lb.)	61-00	92-00	45-70		± 20
Rice .	Lb. (milled)	2-62	3-95	90-60		± 20
Potatoes	Bushels (60 lb.)	90-00	135-00	241-40		± 20
Beef and veal	Values of beasts (inc. offals, etc.) per lb. of dressed weight	9-10	10-90	17-70	27-7	± 25
Mutton and lamb	Do.	12-30	15-60	3-00	4-0	± 25
Pig meat	Do.	13-80	23-40	15-20	19-2	± 15
Butter	Lb.	35-90	47-30	3-47	5-5	± 30
Sugar	Lb. raw sugar	2-94 *	4-62	27-40	61-3	± 10
Eggs .	Lb. (8 eggs of average size)	14-40	31-20	6-80	4-9	± 20
Cheese	Lb.	19-30	32-60	1-59	2-2	± 25
Cotton	Lb.	13-10	13-40	6-86	37-3	± 50
Tobacco	Lb.	15-80	36-00	3-02	4-5	± 15
Maize	Bushels (70 lb.)	65-00	91-00	..	..	± 20
Peanuts	Lb. (unshelled)	1-16 †	1-30	..	..	± 25

* Weighted average world price.

† London c.i.f. prices for shelled, converted at current rates of exchange and on the basis of 1½ lb. unshelled = 1 lb. shelled.

increases is substantially less than 90 per cent. It is anticipated that the greatest increases in price, and also of production, will occur in those minor agricultural products not covered by the above table.

In the case of sugar an average price for different centres is quoted, not the American price. The world sugar market is so divided into different preferential areas that there is really no such thing as a world price of sugar. The American price differs substantially from that prevailing in other markets. A weighted average has been computed for the protection per lb. (i.e. difference between local and free import price) given to sugar produced in the various protected areas, i.e.

the British Empire, Great Britain, India and Australia (which each have special protection above the British preferential price), U.S.A. and territories, the French Empire and Germany.

	1909-13	1926-29	1931-34	1936-38
World production of sugar (million metric tons) :				
Unprotected	2.6	5.8	5.4	10.3
Protected	14.9	20.4	17.7	17.1
	17.5	26.2	23.1	27.4

	1909-13	1921-24	1925-29	1930-34	1935-38
Value in U.S. cents per lb. :					
Unprotected world price (Java floating cargoes)	2.80	4.07	2.56	1.02	1.18
Weighted average protection (protected and non-protected output taken together)	0.35	0.37	0.41	1.88	1.58
World price	3.15	4.44	2.97	2.90	2.76

Since 1930, it will be noticed, the weighted average world price of sugar (including the unprotected areas) has included an element of protection actually bigger than the "free market" price.

In the other commodities American prices are fairly close to world prices (the U.S. having been an exporter of many of them during this period) except in the case of beef, mutton and peanuts. Australian meat export prices for that period are as follows, converted into cents at current rates of exchange (these figures are for the dressed meat, not the live animal, but the costs of slaughtering and dressing almost exactly balance the value of hide and offals) :

Beef	6.2
Mutton	7.3
Lamb	11.2

In the case of peanuts the American producer obtains a price far above the world market price.

The reader will notice that no reference is made in the table to rubber, wool or silk. The reason is that these are the three primary products most nearly threatened by the competition of synthetic products, and their economic future during the next twenty years is very uncertain. It is considered that the other products are free from this danger up to 1960, but not necessarily after that date.



	Foods, etc., Consumed, deduced from Real Income per 2500 Hours per Head					1960 Real Income (P = 1.85), Milliard I.U.	Per Head of Whole Popula- tion
	1909-13	1921-24	1925-29	1930-34	1935-38		
U.S.A.	84	87	96	78	91	135.70	879
Canada	73	81	92	78	89	10.80	701
Argentina and Uruguay	59	70	79	74	85	15.45	754
Rest of America	28	28	28	28	28	42.40	272
Great Britain and Northern Ireland	78	74	86	85	95	27.90	599
Eire	53	49	57	57	61	1.302	423
Norway	35	45	45	46	57	1.470	461
Sweden	37	50	55	59	69	3.76	527
Denmark and Iceland	48	50	54	59	66	2.15	480
Finland	25	18	30	36	43	1.65	384
France	55	59	61	61	68	18.20	429
Spain	43	50	51	51	53	12.50	391
Portugal	27	26	27	28	30	3.63	390
Holland	57	66	68	60	65	4.93	481
Belgium-Luxemburg	43	45	53	55	61	3.39	385
Germany-Austria	53	56	58	53	66	42.50	510
Switzerland	57	73	81	74	81	2.06	466
Italy	29	29	35	35	36	18.70	395
Baltic States	26	18	26	26	27	2.08	344
Poland	27	24	27	27	27	14.52	369
Czechoslovakia	33	34	38	36	36	6.76	431
Hungary	25	28	34	33	36	3.53	363
Balkans	24	24	26	26	26	14.35	187
Australia	64	75	83	76	88	6.325	645
New Zealand	78	87	92	89	109	1.564	721
U.S.S.R.	26	17	25	25	27	72.40	336
Japan	16	19	26	27	33	32.20	350
India and Burma	18	18	18	18	18	67.40	135
China	16	16	16	16	16	40.10	67
W. Asia	17	17	17	17	17	5.57	65
S.E. Asia						4.91	53
Java						3.87	54
The Islands						3.55	93
Africa	18	18	18	18	18	22.10	93

* Only countries for which

WORLD EQUILIBRIUM

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Per Occu- pied Person	Do. Per- centage Increase on 1935-38	Percentage Distribution of Occupied Population					
		Current Figures (Most Recent Census)			Estimate for 1960		
		Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
2307	66	19.3	31.1	49.6	16.4	26.5	57.1
1792	33	34.5	23.2	42.3	23.6	17.5	58.9
1757	53	22.6	43.0	34.4	17.5	23.6	58.9
598	50	37.9	27.9	34.2 (Chile *)	25.7	11.6	62.7
1517	26	6.4	43.9	49.7	4.2	44.1	51.7
1033	34	49.6	16.2	34.2	27.9	19.1	53.0
1034	52	35.3	26.5	38.2	18.4	21.2	60.4
1182	48	32.3	29.2	38.5	16.7	21.1	62.2
1151	44	35.7	27.5	36.8	22.7	13.5	63.8
846	70	51.0	30.4	18.6	31.2	20.3	48.5
1004	25	25.0	39.7	35.3	20.7	27.8	51.5
937	56	57.0	24.6	18.4	23.0	27.0	50.0
931	151	47.6	52.4		24.5	26.1	49.4
1132	33	20.8	39.2	40.0	17.2	25.3	57.5
972	39	17.1	47.8	35.1	14.5	33.4	52.1
1127	45	24.3	38.5	37.2	15.9	27.3	56.8
1120	12	21.3	44.9	32.8	18.0	25.5	56.4
869	112	42.9	31.1	26.0	24.0	26.0	50.0
735	110	57.7	19.8	22.5	34.5	19.8	45.7
785	124	61.6	18.0	20.3	18.2	36.3	45.5
902	100	27.3	43.6	29.1	17.3	34.9	47.8
786	87	54.1	24.8	21.8	41.9	14.5	43.6
404	35	{ Greece * 44.2 Bulgaria * 67.3	33.9	21.9	49.4	8.5	42.1
1610	34		17.4	15.3			
1888	17	24.4	29.4	46.2	12.3	17.6	70.1
705	118	27.1	24.2	48.7	8.6	13.5	77.9
799	110	74.1	15.4	10.5	25.2	36.0	38.8
301	52	50.3	19.5	30.2	13.0	38.5	48.3
161	46	62.4	14.4	23.2	27.7	57.3	15.0
195		75.0	5.0	20.0	40.1	44.9	15.0
161	..	{ Thailand * 84.1 Turkey * 73.1 Palestine * 52.6	2.2	13.7	68.0	17.0	15.0
162			11.5	15.4	61.2	23.8	15.0
280			17.9	28.5	57.8	27.2	15.0
280	40	85.0	15		60.5	24.5	15.0
280					60.6	24.4	15.0

Census data available.

CHAPTER VI

THE AVAILABILITY OF CAPITAL

(See notes at end of chapter)

A FAIR amount of information is available regarding the amount of capital in use in different countries and times, in such a form that it can be converted, for the purpose of international comparisons, to a uniform basis of international units of capital per occupied person in work. Capital is defined, so far as possible, so as to exclude all land values, and also non-income-yielding personal possessions such as furniture and private cars, but to include dwelling-houses and useful publicly-owned assets such as roads.

When all the data of capital per head are plotted on a logarithmic diagram in comparison with data of income per head they are found to lie fairly closely on a parabolic curve. As with the data on agricultural production and density, the validity of this curve is then tested by the use of U.S. regional data, although in this case the regional figures are of a very approximate nature. These regional data confirm the relationship over an important part of its length.

The fact that real income per worker and real capital per worker appear to be in determinate relationship must not be taken to show that they are in a functional relationship, at any rate not in a relationship of the nature indicated by the curve. In other words, it must not be assumed that if enough capital were suddenly poured into, say, Spain, to raise its capitalisation per head to that of the Pacific region of the U.S.A., that income would then rise in the proportion indicated by the parabolic curve. There are too many other variables. Outstanding among these are the varying capacities of the populations and varying abundance of natural

Real income produced appears to have advanced at about the same rate as the number of man-hours worked, i.e. real income per head has been stationary. On the other hand, there has been an enormous increase in the amount saved and invested. Figures published by Mr. Gordon Fulcher (*Review of Economic Statistics*, February 1941) appear to indicate a marginal propensity to save of 0.31 (i.e. increase of savings per unit increase of money income). Applying this to income changes which have taken place since 1937 (the last year which Mr. Fulcher's estimates cover), it appears that the amount of savings has nearly doubled.

Expressing the amount of savings as absolute units rather than as a percentage of national income, we again obtain a fairly determinate relationship between income and savings. As income per head rises, absolute volume of savings per head also rises, but the proportionate amount of national income saved tends to fall slightly beyond ranges of real income per head of about 1000 I.U.

The extreme divergence of the American figure for 1934-37 has been commented on in the notes above. It will be seen that by 1940 a normal relationship had again been resumed. Comparatively low rates of saving are shown by Great Britain, Australia and Canada. The cause for the comparatively low rate of saving in Great Britain must probably be sought in factors peculiar to that country (possibly high death duties, or comparative lack of opportunities for investment).

Looking at the Australian and Canadian data it may also be surmised that a rapid rate of capital inflow tends to reduce local savings. This hypothesis is confirmed when we note the comparatively low level of savings in relation to income in Germany and Austria between 1925 and 1930.¹

Abnormally high rates of saving are shown by U.S.A.

¹ An interesting if unusual confirmation of this hypothesis also comes from Palestine. According to Gruenbaum's *National Income and Outlay of Palestine*, 1936, the Jewish population of Palestine with a national income of £18.5 millions, or about 570 I.U. per occupied person, show a negative rate of saving of -0.5 per cent of their income. Capital inflow to the Jewish community in Palestine during the year was at the unprecedented rate of 46 per cent of the national income.

and Germany for 1900 to 1910, Great Britain 1860-69, Holland and Sweden in recent years, and Japan throughout. These are all known to have been periods of rapid expansion and of considerable investment opportunities.

It now becomes possible to prepare tables showing the anticipated balance between world supply and demand for capital over the period up to 1960.

In the first two columns of the table are given figures of capital required per head of working population, as deduced from the income-capital curve, for 1935-38 and for 1960. (This deduction is not made for the period 1935-38 for U.S.A., Great Britain, Spain, Australia and New Zealand, because in their case direct information on capital is available.)

By linear interpolation figures of working population are obtained :

- (1) For the middle of the period 1935-38 ;
- (2) For March 1945 (assumed to be the date by which normal incomes and rates of accumulation will have been restored) ;
- (3) For the middle of 1960.

By multiplying population and capital figures together we obtain estimates of the actual amount of capital now in use in milliards of I.U., together with anticipated requirements for 1960, if the levels of real income computed in the previous chapter are to be attained.

In the next three columns are shown the rates of savings in I.U. per occupied person per year for 1935-38 and for 1960, as deduced from the savings-income curve, together with actual figures for 1935-38 for the countries for which they are available.

In the next three columns are shown anticipated or actual rates of savings in milliard I.U. per year for different countries. Rates of savings per head of the occupied population are based on the income-savings curve except for Japan and U.S.S.R., where higher rates are allowed (93 and 51 I.U. per occupied person

respectively) in accordance with recent experience.

In the first column are shown countries not seriously affected by war or consequential economic disturbances, where capital accumulation is assumed to proceed uninterruptedly from 1935-38 to 1960.

In the second column are included all the countries affected by the war. In their case it is assumed that the 1935-38 rates of accumulation (and of real income) per head of working population have been regained by 1945, and accumulation is assumed to proceed uninterruptedly from that date till 1960. The aggregate savings up to 1960 are obtained on the assumption of linear increase from 1935-38, or from 1945 as the case may be.

Account must next be taken of the effect of war damage which will have to be replaced. In Great Britain *The Economist* has made an estimate that war damage is at present taking place at the rate of 5 per cent per annum in London and 2 per cent per annum in the rest of Great Britain. London includes one-fifth of Britain's population and probably a slightly higher percentage of her capital. It is assumed that the overall rate of war damage for the entire period of the war will be $7\frac{1}{2}$ per cent of the aggregate capital in existence during 1935-38, for Britain and for other countries suffering direct war damage.

Some confirmation on this latter figure can be obtained from estimates prepared in Holland and Norway. In Holland the war damage (*The Economist*, 30th November 1940) has been 1.5 milliard florins, or 0.75 milliard I.U., as compared with the estimate of 0.81 milliard I.U. as made on the $7\frac{1}{2}$ per cent basis. For Norway (*The Economist*, 18th January 1941) the estimate was 500 million kroner, or not much more than 0.1 milliard I.U., as compared with the estimate of 0.24 milliard I.U. as made on the $7\frac{1}{2}$ per cent basis.

In the next column is shown the surplus or deficit of savings by 1960 on the above assumptions. It will be noted that in the aggregate this amounts to the substantial deficiency of 259 milliards. On the other

hand, the estimated aggregate rate of saving in 1960 will be as high as 61 milliards. We cannot, however, assume that savings will catch up with requirements in four years only, because of the fact that working population will be increasing in many of the principal capital-absorbing countries. We may work out, therefore, the amount of capital which will be required in each country round about 1960 to do no more than maintain a stationary level of income per head for the increasing working population (last column). These figures in the aggregate amount to 18.7 milliard I.U. per annum, out of the 61 milliards of world savings, leaving a margin of 42.3 milliard I.U. per year to catch up arrears. On the above assumption, therefore, the arrears will be caught up in six years, by 1966.

It is not of course anticipated that events will proceed as described in the above calculation. Probably one of the two following alternatives will occur :

- (1) The levels of real income per head anticipated for 1960 will in fact be postponed, as a result of lack of capital, till about 1966.
- (2) The existence of investment opportunities may lead to forced saving to supplement voluntary saving. This forced saving may come about as a result of Government action, or unconsciously as a result of a generally rising price level, which has the effect of transferring real resources into the hands of capitalist enterprises at the expense of other sections of the community.

In the further table which follows (p. 82), these two alternatives are tried out and computation made of the aggregate of capital movements from 1945 up to the supposed attainment of equilibrium (1966 on the first hypothesis and 1960 on the second). On the second supposition the movements exactly balance ; on the first hypothesis there is a small discrepancy.

It will be seen that whichever hypothesis we adopt makes very little difference to the results. Britain will

[illegible]

Savings I.U. per Occupied Person, Calculated from Income			Savings, md. I.U. per Annum			Aggre- gate Over Period (Linear Inter- polation, md. I.U.)	War Damage, 7½ per Cent of Capital, md. I.U.	Net Savings, md. I.U.	Surplus or Deficit, md. I.U.	Rate of Income of Working Population per Cent per Annum about 1960	Current New Capital Require- ments at Given Real Income per Head, md. I.U. per Annum
1935-38		1960, Calcu- lated	1935- 1938	Mar. 1945	Mid- 1960						
Actual	Calcu- lated										
100	155	212	..	8-30	12-50	158-0	..	..	+ 7	0-83	3-08
..	153	186	..	0-75	1-12	14-2	..	..	+ 1	1-37	0-43
..	134	183	0-83	..	1-61	28-7	..	..	+ 7	1-47	0-67
..	38	63	1-62	..	4-45	71-2	..	..	- 15	1-55	2-28
93	150	167	..	3-00	3-06	46-1	7-80	38-3	+ 58	- 0-15	- 0-13
..	88	119	..	0-11	0-15	2-0	..	..	+ 1	0-06	..
..	75	120	..	0-10	0-17	2-0	0-24	1-8	0	0-47	0-02
..	93	135	..	0-27	0-43	5-3	..	..	0	0-49	0-06
..	93	130	..	0-16	0-24	3-1	..	..	0	0-40	0-03
..	48	98	..	0-08	0-19	2-0	0-20	1-8	- 1	0-47	0-03
..	93	116	..	1-68	2-10	28-8	4-15	24-7	+ 14	0-17	0-10
..	62	108	..	0-67	1-44	16-2	1-35	14-8	- 9	1-10	0-46
..	33	107	0-09	..	0-42	6-1	..	..	- 2	1-10	0-13
..	98	130	..	0-37	0-57	7-2	0-81	6-4	0	0-58	0-09
..	78	112	..	0-27	0-39	5-0	0-72	4-3	+ 1	0-17	0-02
101	89	130	..	3-01	4-90	60-4	7-10	53-3	- 1	0-86	1-20
..	116	129	..	0-22	0-24	3-5	..	..	- 3	0-11	0-01
56	36	100	..	0-67	2-15	21-5	1-90	19-6	- 18	0-34	0-21
..	28	83	..	0-07	0-23	2-3	..	..	- 2	0-12	0-01
..	28	90	..	0-39	1-67	15-7	1-10	14-6	- 21	0-25	0-13
..	42	105	..	0-28	0-79	8-1	..	..	- 5	0-01	..
..	38	91	..	0-15	0-41	4-3	..	..	- 3	0-20	0-02
..	23	37	..	0-57	1-31	14-2	..	..	- 17	0-27	0-14
124	137	173	..	0-42	0-68	8-4	..	..	+ 2	1-58	0-30
184	173	193	..	0-12	0-16	2-1	..	..	0	1-29	0-06
51	26	78	3-30	..	8-00	133-0	..	..	- 46	0-96	2-42
..	33	93	..	2-92	3-75	51-7	..	..	- 32	1-08	1-20
..	8	23	1-12	..	5-00	72-0	..	..	- 72	0-89	2-02
..	0	2	..	0	0-45	3-4	2-80	0-6	- 60	1-00	0-96
..	0	8	0	..	1-00	11-8	..	..	- 36	2-00	1-56
..	8	19	0-44	..	1-50	22-8	..	..	- 3	2-00	1-16
..	..	..	..	..	61-00	831-1	..	..	- 259	..	18-70

Assuming that Average Real Incomes per Head postulated for 1960 are not attained till 1960		Assuming that Saving throughout the World during the Period up to 1960 is increased in the Proportion necessary (31.2 per cent) to make sufficient Capital available for Anticipated Needs of 1960				
Working Population (millions), Mid-1960	Capital Required (I.U. md.), 1960	Savings (I.U. md.) in 1960	Aggregate Savings, 1935-38 to 1960 (I.U. md.)	Capital in Existence in 1935-38, less War Damage (I.U. md.)	Capital Inflow (+) or Outflow (-) during 1945-60 required for Equilibrium (I.U. md.)	Net Inflow (+) or Outflow (-) of Capital during Period 1945-60 (I.U. md.)
U.S.A.	60.20	12.80	222.00	220.00	-62.00	-53.0
Canada	33.90	1.21	20.80	18.30	-5.20	-5.0
Argentina and Uruguay	49.30	1.75	38.10	23.50	-12.30	-15.0
Rest of America	151.00	4.57	91.30	61.40	-1.70	-6.0
Gt. Britain and Nor. Ireland	84.00	3.04	64.10	96.70	-76.40	-71.0
Eire	4.35	0.14	2.65	3.20	-1.50	-1.5
Norway	5.01	0.18	2.97	2.61	-0.57	-0.5
Sweden	12.60	0.44	7.54	7.58	-2.50	-2.5
Denmark	7.22	0.25	4.35	4.40	-1.53	-1.5
Finland	5.67	0.20	2.97	2.32	-0.38	-0.5
France	61.50	2.13	40.40	45.30	-24.40	-22.0
Spain	44.50	1.54	23.40	16.65	-4.50	-4.0
Portugal	13.00	0.44	7.81	3.99	-1.20	0
Holland	16.70	0.58	10.10	9.00	-2.40	-2.0
Belgium-Luxembourg	11.40	0.40	7.10	8.00	-3.70	-4.0
Germany-Austria	140.00	5.17	86.80	77.90	-19.00	-17.0
Switzerland	6.79	0.24	4.88	6.30	-4.40	-4.0
Italy	64.70	2.19	30.30	23.10	-11.30	-11.0
Baltic States	7.27	0.24	3.29	2.50	-1.50	-1.5
Poland	50.80	1.69	22.10	13.10	-15.60	-16.0
Czechoslovakia	22.90	0.79	11.40	9.90	-1.00	-2.0
Hungary	12.30	0.41	5.95	5.30	-1.00	-1.0
Balkans	52.50	1.34	20.30	20.20	-12.00	-13.0
Australia	20.90	0.75	12.40	12.70	-4.20	-4.5
New Zealand	4.84	0.17	3.08	3.00	-1.24	-1.2
U.S.S.R.	206.00	8.47	174.00	73.00	-19.00	-7.0
Japan	118.00	3.99	73.30	36.00	-9.00	-17.0
India	238.00	5.28	94.40	82.00	-62.00	-51.0
China	102.00	0.48	5.10	32.20	-65.00	-59.0
Rest of Asia and Oceania	87.50	1.12	16.50	30.00	-41.00	-32.0
Africa	88.00	1.67	31.10	32.00	-2.00	-4.0
..	..	..	..	..	Aggregate outflow - 223	Aggregate outflow - 215
					Aggregate inflow + 247	Aggregate inflow + 215

continue to be the main source of capital outflow. This will be because her level of industrial productivity gives her a ratio

$$\frac{\text{Rate of saving per occupied person}}{\text{Capital required per occupied person}}$$

rather higher than for the U.S.A.; but much more momentously, because her working population will tend to decline while that of the U.S.A. continues to increase. The U.S.A. will hold second place as the supplier of capital, followed by France, where the working population will also be stationary or declining. The fourth supplier of capital will be Germany. Another interesting paradox is that the South American and Australasian countries will apparently have reached a stage of development where they have an appreciable capital outflow. There will also be a certain capital outflow from Canada, Belgium, Sweden and Switzerland.

By far the greatest importers of capital will be India and China, followed by the South-Eastern Asiatic countries. Africa apparently will have sufficient internal savings to meet her requirements. To attain full development, capital imports will be necessary into Soviet Russia and Japan, but only to the extent of about 10 per cent of domestic savings. Other substantial importers of capital will be Italy, Poland, Spain and the Balkans.

It is a truism that international capital movements can only take place when there is a reasonable degree of political stability, and it is vain to postulate them if this stability is absent. The problems thus arising will be considered in a subsequent chapter.

Notes

U.S.A.—Dr. Simon Kuznets (*National Income and Capital Formation*, p. 51) gives the value of capital in the U.S.A., omitting land values and consumers' capital such as motor cars and furniture, but including houses, at \$188 milliards at the end of 1922. For all practical purposes he considers that 1922 prices can be regarded as equivalent to 1929 prices. He adds to this total net capital

formation (measured at 1929 prices) for subsequent years. By this method, value of capital in the middle of 1929 was \$244.6 milliards at current prices.¹

To convert 1929 prices to international units (\$ prices of 1925-34) we may note the following price data for 1929 (1925-34 being taken as 100) :

Building costs (American Appraisals Corporation)	. 111.2
Metal goods (wholesale prices)	. 109.2
Cost of living	. 108.0

It is assumed that, for the purpose of converting values of capital goods, 1929 prices were 10 per cent above those of 1925-34. Using this factor, we can obtain capital values expressed in I.U. back to 1919 from Dr. Kuznets's figures. The comparison can be carried back a little further by the use of figures given by Professor Douglas in *The Theory of Wages*. These are expressed in \$ of 1880 purchasing power and are linked to Dr. Kuznets's figures over the period 1922-29.

Years	Value of Capital in md.			Occupied Persons in Work, m.	Capital per Breadwinner, I.U.
	I.U. (Dr. Kuznets)	1880 \$ (Professor Douglas)	I.U. deduced from Second Column		
End 1935	217.5	..	..	42.3	5150
End 1929	226.8	..	..	47.0	4830
End. 1922	171.0	..	..	39.5	4330
1922-29	203.0	72.30	..	42.8	4750
1914-21	..	58.30	164	38.0	4310
1909-13	..	46.75	131	35.8	3660

Approximate Regional Figures for U.S.A.—

These data were calculated as follows :

For income were used 1929 data of average income per head in each region given in *America's Capacity to Consume*. These were multiplied by a factor of 2.5 to convert them from income per head to income per occupied person. They were then reduced by 10 per cent to convert them from 1929 \$ to I.U.

For capital the results of the last official estimate of 1922 were used. These were first increased by 30 per cent to allow for

¹ A figure of \$361 milliards is given by H. G. Moulton (*Income and Economic Progress*, p. 74), excluding personal possessions and rural land values, but including urban land values. The difference of \$116 milliards between this estimate and the above probably approximately represents the aggregate of urban land values.

the increase of capital between 1922 and 1929, then reduced by 52 per cent to exclude land values and capital in personal goods. Both these procedures are doubtful, as the rate of increase and the proportion of the land values, etc., probably differed substantially from region to region, and only highly approximate results can be expected. The results were then converted for the ratio between occupied and total population and for the ratio between 1929 prices and those of 1925-34, as in the case of income. The following results were obtained (expressed in logarithmic form for insertion in the diagram):

LOGARITHMS OF INCOME AND CAPITAL
PER OCCUPIED PERSON
(I.U. 1929)

	Income	Capital
New England	3.26	3.65
Mid-Atlantic	3.35	3.68
East North Central	3.24	3.64
West North Central	3.08	3.71
South Atlantic	3.00	3.45
East South Central	2.87	3.31
West South Central	3.01	3.42
Mountain	3.16	3.69
Pacific	3.32	3.74

BRITAIN.—The figures are obtained from Lord Stamp's *The National Capital*, with slight adjustments as follows:

	£ md.	
	1928	1935
Lord Stamp's total	18.17	21.50
Add back foreign holdings in Great Britain	18.67	22.00
Deduct land	17.72	21.00
Deduct furniture	16.20	19.35
Add back U.S. debt deducted	16.20	20.10
Occupied persons in work (millions)	18.90	20.00
£ per head	857.00	1005.00
Average for two years	£931, or 4860 I.U. per head	

average value of farm buildings and homesteads as 584 yuan per farm, or \$240 at the rate of exchange then current. This may be put at \$100 per occupied person, or, allowing for the purchasing power of money in China, about 133 I.U. Making 40 per cent allowance for capital other than farm buildings (probably generous) this becomes 185 I.U. per occupied person.

OTHER COUNTRIES.—Table in *C.E.P.* p. 389 mainly based on Lord Stamp's figures for 1913.

CHAPTER VII

HISTORICAL STUDY OF THE TERMS OF TRADE AND RELATED PHENOMENA

THERE are few fields more deserving of study by economists than conjuncture-statistics, or studies of economic fluctuations, over the past century. Such studies as have so far been made in this field have yielded a rich harvest.

The movements which these figures show are generally analysed into two categories known as cyclical and secular. Cyclical movements are understood as those which show a fairly regular fluctuation with a periodicity in the neighbourhood of eight years.¹ Movements showing a sustained tendency over a long period are defined as secular, long-period, or structural phenomena. The word "secular" has been somewhat discredited in connotation owing to the particularly wooden application of supposed "secular trends" fashionable some years ago. It appears that the word "structural" might have preference, because it draws attention to the more deep-seated changes in the structure of the economy; which changes, and not the mere lapse of time, are the determinants of long-period trends.

The analyst of these data naturally first turns his attention to the phenomena of the trade cycle, in the sense that that phrase is usually understood, but his studies are highly superficial if he does not soon discover that the trade cycle is always superposed on longer-period movements. The phenomena of these long-period movements and of individual trade cycles interact upon each other. Thus, during a long-period downward

¹ This figure of eight years as a statement of average periodicity is purely empirical, but mathematical reasons for considering the periodicity of the trade cycle to be of about this length are advanced by Dr. Radice (*Econometrica*, 1939).

movement of world prices, the depression phase of each trade cycle is much deeper and more prolonged than is the depression phase of cycles which occur during the course of a long-period upward movement.

It has been postulated that the period 1945 to 1960 will be a period showing the following phenomena :

- (1) Large international capital movements.
- (2) Full employment.
- (3) Great expansion of the volume of world trade.
- (4) Outflow of labour from primary into secondary and tertiary industries at a higher rate than before.
- (5) Improvement of the terms of trade in favour of primary production.

It is now appropriate to search the historical data to see whether such movements have occurred during the past. The analysis made so far has shown that the above five phenomena are all mathematically (*i.e.* logically) associated. If we find periods in the past where such phenomena have also been closely associated (together with other periods where the reverses of all these phenomena have also been associated) this will serve to a certain degree to test both the logic and the assumptions on which the propositions rest. It will also serve to draw attention to further phenomena (*e.g.* gold production, interest rates) which may be associated with the above.

A priori consideration indicates the hypothesis that the most deep-seated motive force of these long-period changes lies in capital movements. The world's fields of investment seem to pass, with long alternations, through capital-hungry and capital-sated phases.¹ A capital-hungry phase is predicted for 1945-60, but it

¹ This point of view has been largely built up out of ideas absorbed, during many years of contact, from Professor D. H. Robertson, to whom I am glad to express my appreciation. But he does not state his conclusions in the above form, and bears no responsibility for the formulation or the conclusions drawn from it.

appears, from the same calculations, that at some date in the 1960's the world will probably again reach an abrupt termination of this phase and that another capital-sated phase will follow.

The consequences from such an hypothesis should now be deduced and confirmation of the deductions then sought in the observed results. Assume first that we are in a "capital-hungry" period. We expect to see in the first instance an active flow of investment, both international and internal, within States. This will lead to a full use of resources and an absence of "chronic" unemployment, the amounts of unemployment observed from time to time being explicable in terms of the trade cycle and of local or temporary maladjustments. There will be an increase in the volume of world trade, arising, in the first place, from the international capital movements themselves and, secondly, from the flow of products from newly developed resources. Increasing external and internal investment will be accompanied by a rise in the general level of prices. The world's natural tendency is for labour to be gradually transferred away from primary production to other forms of production, but this flow will probably be accelerated during the period of active investment, and dammed back during the period of sluggish investment. This uneven rate of outflow of labour from the primary industries is the fundamental explanation of changes in the terms of trade. For the demand for the products of primary industries is inelastic as compared with the demand for the products of secondary and tertiary industries, and therefore an acceleration of the rate of outflow of labour from primary industries will tend to raise the relative price of primary products.

Two other economic phenomena of great importance, namely, gold production and interest rates, are clearly associated with the above group of phenomena, but their precise relationship cannot theoretically be determined. They are therefore subjected to further empirical examination.

We now proceed to identify capital-hungry and capital-sated periods in historical experience.

Satisfactory figures for the rate of net accumulation of capital in Great Britain are not available before 1907. But annual figures for *gross* internal investment for the period 1870 to 1913 have been computed by Dr. Cairncross of Glasgow University.¹ These figures include depreciation and maintenance but exclude about 20 per cent of capital goods production, for which no information is available. Dr. Cairncross's figures include net external investment (as computed by C. K. Hobson). The annual data are summarised for periods of years for which comparative statistics of national income are available (*National Income and Outlay*, p. 232).

These periods, it will be noticed, are each chosen so as to cover a complete trade cycle, and comparison between the periods therefore enables us to deduce the true long-period trend.

Years	National Income, £ million	As Per Cent of National Income		
		Gross Internal Investment (Incomplete)	Net External Investment	Total
1870-1876	1177	23.5	3.9	27.4
1877-1885	1242	21.0	1.4	22.4
1886-1893	1410	14.9	4.3	19.2
1894-1903	1666	17.7	1.5	19.2
1904-1910	1940	17.4	6.1	23.5

These figures clearly indicate a downward movement in investment relative to national income from the 1870's until the beginning of the present century, from which date there was a marked upward movement.

A table in *C.E.P.* p. 397 shows that *net* investment in Great Britain during the period 1860 to 1869 was also at a far higher rate, relative to income, than during the first decade of the present century; and that since 1920 the rate of investment relative to income has been much lower than at any previous period.

¹ Privately communicated.

For the U.S.A. comparisons can be made over the period 1880 to 1929 (see p. 80-81 above). Re-expressing the data of both income and capital at 1880 prices, we obtain the following:

Years	Md. \$ at 1880 Prices		Net Increment per Annum as Per Cent of Real Income
	Real Income per Year	Net Additions to Capital per Decade	
1880-90	10.4	8.6	8.0
1890-1900	15.4	7.5	4.9
1900-1911	21.1	20.8	8.9
1911-19	26.0	12.2	6.3
1919-29	30.6	22.0	6.6

Here we notice a marked minimum in the 1890's, though unfortunately it is impossible to determine whether the downward trend had already set in before the beginning of the 1880's. In the U.S.A., investment relative to national income was maintained during the 1920's at nearly as high a level as in the first decade of the century.

The diagram which follows shows certain annual data of international capital movements expressed as percentages of national incomes.¹

The British data open with a clearly marked peak in the early 1870's, followed by a slump to zero. The whole period from that date to 1904 is one of comparatively low capital outflow, except for the five years 1886 to 1890, which recovered the 1873 level. This recovery, however, appears to have been peculiar to Great Britain (it may be associated with the active inflow of capital into Australia during that period, as shown on the lower

¹ Sources:

BRITAIN—C. K. Hobson, *The Export of Capital*; and the Board of Trade.

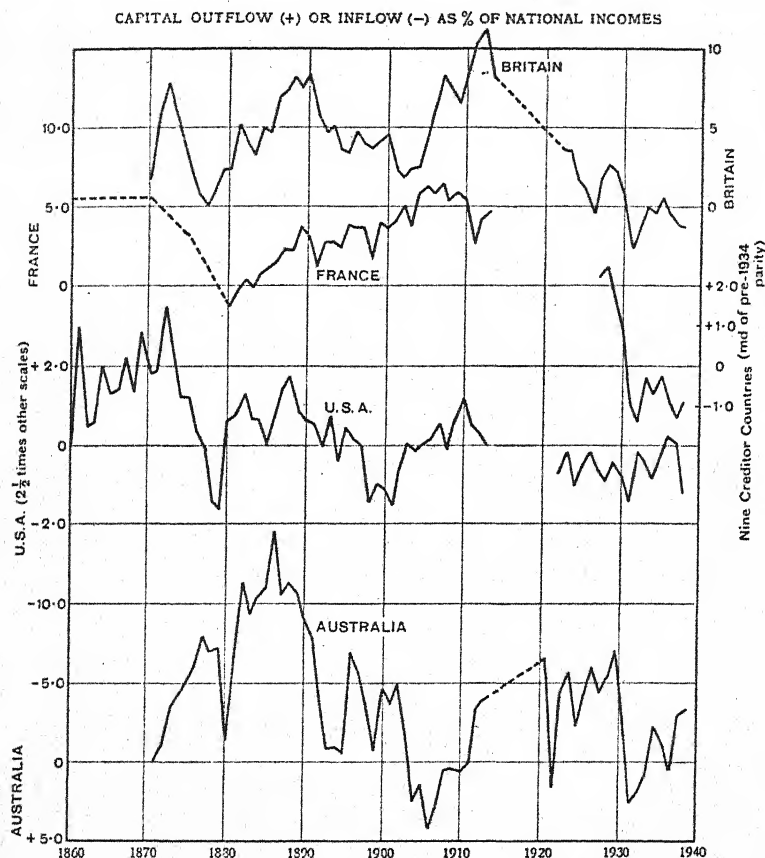
FRANCE—White, *The French International Accounts*; Simiand (*Le Salaire*, vol. iii. p. 97), for net increment of foreign holdings (8 milliard francs) between 1850 and 1870.

AGGREGATE for nine creditor countries—League of Nations.

U.S.A.—*Review of Economic Statistics*, 1919, and Department of Commerce.

AUSTRALIA—Dr. R. Wilson, *Capital Imports and the Terms of Trade* and subsequent publications.

part of the diagram) and was associated with low internal investment. The period from 1904 to 1913 was one of rapid increase. From 1922 to 1938 the general trend has been markedly downwards.



In the case of France there appears to have been a high rate of capital outflow between 1850 and 1870. (Some figures quoted by White appear to indicate a still greater rate of outflow than that shown during the 1860's.) This was followed by a period of much reduced outflow until about the turn of the century. The effects

of the war of 1870 were only felt for a few years, and the general low level between 1875 and 1900 is part of the world movement.

The aggregate absolute figures for nine principal creditor countries are available for 1927 onwards, and show how the outflow entirely ceased after 1930 and was converted into an actual net capital inflow. The remarkable violence of the movement makes it clear that 1929-30 marked one of these long-period turning-points, accentuated by its coincidence with the climax of the trade cycle.

The figures for the U.S.A. must be interpreted in the light of the fact that she was an importer of capital in the earlier years, gradually changing over to the rôle of a capital exporter. Capital imports rose to a very clearly marked peak in the early 1870's and then fell to nothing for a long period. Apart from a partial recovery in the latter 1880's the true turning-point does not appear to have been reached till the earlier years of the present century. Capital inflow was not very marked between 1903 and 1913, but it must be remembered that by that time the transformation of the U.S.A. into a capital-exporting country was almost at hand. From 1922 to 1931 there was an increasing capital outflow, small in relation to the national income of the U.S.A., but large in relation to borrowers' requirements. After 1931 this capital outflow ceased.

Australia also shows long-period movements of about the same duration but much later in phase than those of the other countries examined. For reasons apparently dependent upon Australian geography and history, the climax of capital inflow came in 1886, fourteen years after the climax of the British and American capital movements. This was followed by a long depressed period which persisted till 1911 — again about ten years later than for the rest of the world. The subsequent period of capital inflow, however, was cut off abruptly in 1929-30 as were similar capital movements elsewhere.

To summarise capital movements so far examined we have :

- (1) A capital-hungry phase starting about 1850 and terminating in the early 1870's.
- (2) A capital-sated phase from the early 1870's to about 1900.
- (3) A capital-hungry phase from 1900 to 1929 (the 1920's, however, were much less active in Great Britain than in other countries).
- (4) A capital-sated phase commencing in 1930.

Unemployment records have made it universally clear that the world entered a new long-period phase in 1930. 1929 and 1937 were both peak years of their respective trade cycles, but the world percentage of unemployment¹ was 5.4 in the former and 10.1 in the latter year. In 1932, the low point of the trade cycle, the world average of unemployment stood at the hitherto unprecedented figure of 21.1 per cent.

It cannot but be regretted that full records of unemployment are lacking for the earlier periods. Trade union figures may serve to measure year-to-year fluctuations but are definitely unsatisfactory for long-period trends, as they exclude the unskilled and unorganised workers. We should not, however, entirely ignore the widespread tradition of "bad times" in the last two decades of the nineteenth century.

The next consequence hypothecated from our basic assumption was that a period of active investment would cause an acceleration of the rate of growth of world trade. This has clearly been the case. The following table² gives a series of comparisons. To eliminate cyclical movements, comparisons were made (except for the first two periods) between peak and peak, or between trough and trough, of the trade cycle.

¹ As calculated by the International Labour Office.

² Original data from *C.E.P.* p. 461.

RATES OF CHANGE OF AGGREGATE VOLUME OF WORLD TRADE
MEASURED AT 1929 PRICES
(Per Cent per Annum)

Years	Comparisons of Trade Cycle, Maxima	Comparisons of Trade Cycle, Minima	Points not related to Trade Cycle (included because of Availability of Data)
1851 to 1860	..	..	10.1
1860 to 1869-70	..	..	4.9
1869-70 to 1872-73	6.0	..	..
1872-73 to 1883	4.8	..	..
1879 to 1885	..	2.8	..
1883 to 1886-90	2.8	..	..
1885 to 1892-96	..	4.2	..
1886-90 to 1900	1.4	..	..
1892-96 to 1902	..	- 0.2	..
1900 to 1907	4.6	..	..
1902 to 1908	..	3.6	..
1907 to 1913	3.8	..	..
1920 to 1923	4.3	..	..
1923 to 1929	6.4	..	..
1929 to 1937	..	- 0.4	..

Unweighted average of above : 1850-1875 : : 7.0
 1875-1900 : : 3.2
 1900-1913 : : 4.0
 1920-1929 : : 5.3

The rate of expansion of world trade has slowed down from 7.0 per cent per annum between 1850 and 1875 to 3.2 per cent for the period 1875 to 1900. Between 1900 and 1929 the rate of growth was again increased, while since 1930 the general rate of growth has been negative.

The next development of the hypothesis concerns the varying rates of flow of labour into primary and non-primary industries. For two countries with comparatively large primary producing populations (U.S.A. and Australia) sufficient data are available to test this out over the period since 1870.

In the U.S.A. the depressed phase began in the early 1870's and agriculture absorbed 42 per cent of the net new labour available during the decade 1870 to 1880, a much higher proportion than in subsequent periods. For

NET INFLOW OF LABOUR INTO AGRICULTURE COMPARED WITH
TOTAL NET INCREMENT OF WORKING POPULATION
DURING CERTAIN PERIODS

(Numbers in 000's)

	1870-80	1880-90	1890-1900	1900-10	1910-20	1920-30	1929-37
U.S.A.—							
Agriculture .	1876	1345	967	539	- 480	- 633	180
Total . .	4467	6061	5620	8298	4243	7541	- 1392
	1871-81	1881-91	1891-1901	1901-11	1911-21	1921-33	
Australia—							
Agriculture .	46	70	116	63	42	66	
Total . .	225	451	283	330	358	409	

U.S.A., 1870-1930—Census data, summarised by Weintraub and Magdoff, *Econometrica*, October 1940. 1929-37, persons actually in work only, from *National Income in the U.S.*, 1929-1937 (Dept. of Commerce).

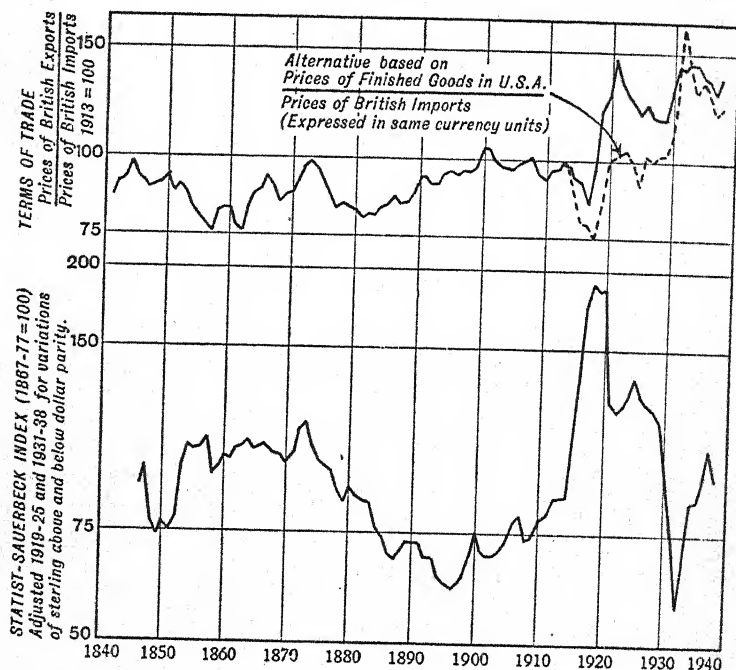
AUSTRALIA, 1901-33—from Industries Volume of 1933 Census. 1871-1901, from *Commonwealth Year Book*, 1928, p. 920 (mining included with agriculture for these years).

the decade 1890 to 1900 this proportion was 17 per cent, but from 1900 to 1930 — the period of active investment — this proportion was trifling or negative. But it is particularly interesting to notice that the first eight years of the next capital-sated phase, namely, 1929 to 1937, were marked by a net inflow of labour into agriculture during the period when there was a substantial net outflow of labour from all other industries.

In Australia, as has been mentioned above, the capital-hungry phase continued to the 1880's, and up to 1891 most of the flow of new labour went into non-primary industries. During the decade 1891 to 1901, however, this proportion was substantially altered. During the subsequent capital-hungry period the proportion of the new labour going into agriculture was again small.

These data, although inadequate, do at any rate give some support to the proposition that an acceleration of the world flow of capital, by developing secondary and tertiary industries, causes a relative diversion of labour away from primary industries and is thus the cause of higher relative prices for primary products.

The facts regarding the terms of trade are quite clear. In the following diagram movements of the terms of trade,¹ as measured by the relative prices of British exports and imports,² are shown in comparison with



movements of the general price level (*Statist* — Sauerbeck).

The same periods with which we are already familiar are clearly marked on the price diagram. After eliminating the short-period effects of the trade cycle we see a great rise in prices occurring shortly after 1850 and

¹ Calculated by W. Schlote, *Entwicklung des englischen Aussenhandels*.

² There is some evidence that after 1913 the price of British export manufactures rose more than the price of manufactures elsewhere, and so an alternative line is drawn based on the U.S. Department of Labour index of prices of finished manufactures, compared with the price of British imports, the latter reduced to dollars at current exchange rates. Comparison of the curves supports the belief that British prices of manufactured goods were out of relation to world prices over the period 1913 to 1931, but not subsequently.

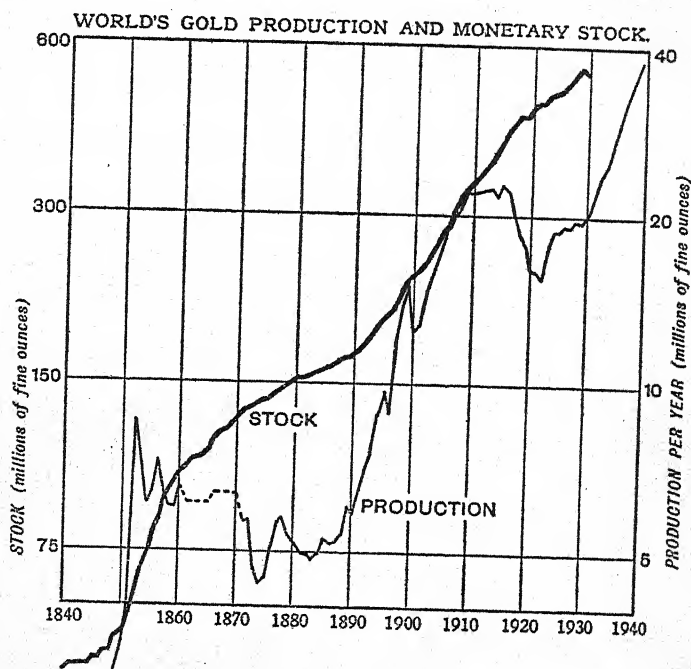
lasting until about 1875. From that date we see a marked decline in prices, with an upward movement beginning about 1900. Disregarding the temporary effects of the war of 1914-18, prices appear to have reached their maximum in 1925, since which date the general trend has been downwards.

The terms of trade had been comparatively stable during the 1840's. Between 1850 and 1880 their general level was much more favourable to primary production, though in 1866 and in 1871-5 (boom periods) the level of the 1840's was regained. Starting about 1880 (not 1875, as in the case of the other series), the terms of trade then moved steadily against primary products till 1900. From 1900 to 1925 the general trend was in favour of primary products, though the slope was slight, and from 1925 to 1929 there was a sort of interregnum. A very violent adverse movement commenced in 1930.

The next diagram examines the question of gold production (U.S. Treasury data) and stocks (Mr. Joseph Kitchin's data). There have been those, including the late Mr. Kitchin, who were inclined to attribute the whole causation of these long-period fluctuations to the comparative abundance or scarcity of gold. It is indeed clear from the diagram that gold stocks were increasing rapidly in the 1850's and that the rate of increase slackened off in the 1870's; that the increase became rapid again in the 1890's and slackened off in the 1920's. All these data so far confirm the supposition that gold stocks might have been the motive force of the observed long-period changes. On the other hand, the enormous additions to gold stocks which took place during the 1930's have not affected the world trading situation.

While nobody would deny to gold an important part in the causation of the observed effects, it seems rather contrary to common sense to treat gold movements as the sole cause of these long-period changes and to ignore altogether the possibility of alternate periods of capital-hunger and capital-satiety. And indeed a close scrutiny of the gold production curve will show that gold

production is, to some degree, the effect rather than the cause of changes in commodity prices and trading activity. A period of high commodity prices and great activity, which tends to raise wages and all other money costs, will obviously have a discouraging effect (with a year or two's lag) on the production of gold, whose price



alone remains stable while others rise. The converse may be expected from a period of falling prices and falling trade activity. Analysis of the gold production curve will show it to be partially controlled by this factor. On the other hand, there are truly autonomous factors such as the discovery of new deposits or processes.

The violent rise in gold production in the middle of the nineteenth century was due to the almost simultaneous discovery of big new deposits in California in 1849 and in Australia in 1851. It does indeed appear

fairly clear that these discoveries had the effect of forcing up world prices and increasing trade activity. Probably there would have been a rise of prices, though less marked, without the gold discoveries ; but with our lack of detailed knowledge of this period it is really impossible to say.

The rich alluvial deposits in both these new fields were exhausted in a few years, and with the necessity for recourse to deeper mining, production inevitably slowed down to a lower level. But the long-period tendency of production was downwards. The deep depression in gold production caused by the price peak of 1873 is of interest. The recovery of gold production after 1883 can probably be attributed to the general low level of world prices and wages, which diverted labour to gold-mining and was an incentive to the exploitation of poorer sources. But the vast acceleration of gold production during the 1890's was largely due to two autonomous factors, being dependent upon chemistry (the discovery of the cyanide process of extraction) and politics (the exploitation of the Transvaal mines). Here again we can say that the upward trend of world prices which began about 1900 was accelerated by these abundant gold supplies, though probably there would have been some price rise without them.

The abrupt cessation of the increase in gold production in 1909, and the low level of the 1920's, can, however, be almost entirely attributed to the level of world prices. There was an autonomous factor, smaller in this case, of the exhaustion of the best veins on the Rand. By the 1930's, however, these veins were still more exhausted than they had been in the 1920's, but production leapt up in response to the low world level of commodity prices. Prices during the 1930's were very low in terms of sterling and dollars ; lower still in terms of gold, because both these currencies had, by 1933, been devalued by 40 per cent in terms of their previous gold parities.

We have established, therefore, that gold production

in the first instance moves in response to, and not prior to, changes in world prices; but that autonomous factors relating to gold production, such as the discovery of new sources, may be a powerful factor affecting the general level of world trade and prices.

An examination of the trend of interest rates in different countries shows a substantial uniformity of movement, subject to disturbances peculiar to each country. Thus American interest rates were forced up for a number of years by the Civil War and subsequent depreciation of the currency. French interest rates were forced up by the war of 1870, but rapidly recovered their previous level. All interest rates were forced up by the war of 1914, but in France this high level was prolonged by the inflation of the 1920's.

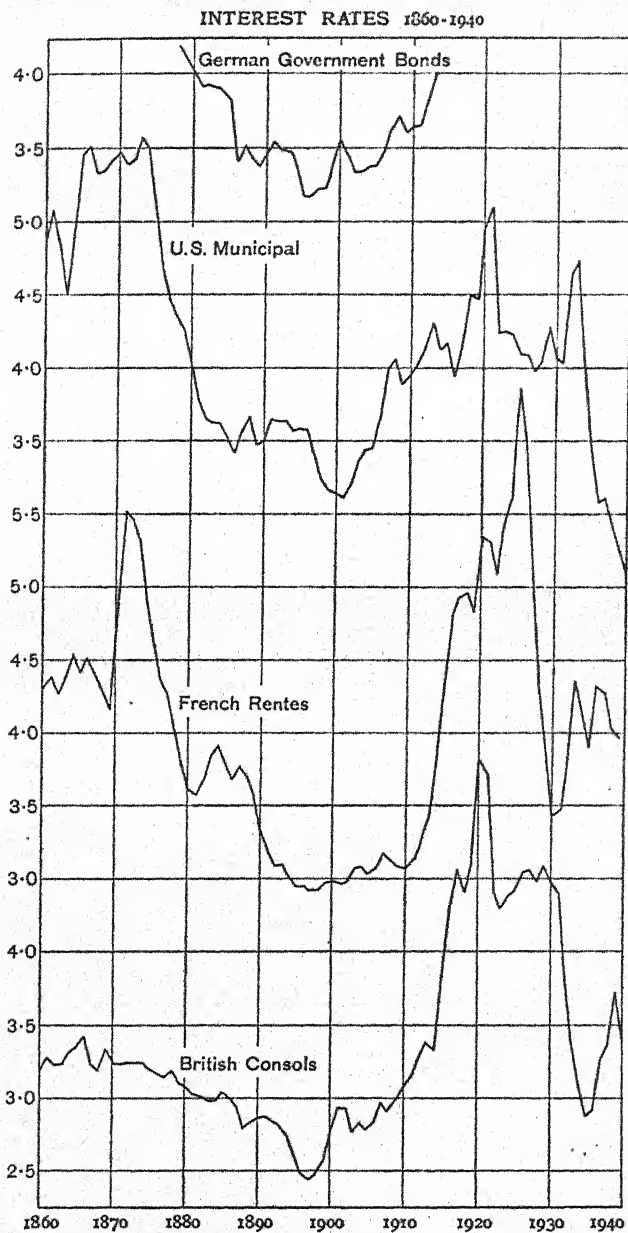
Subject to these factors, we see a period of comparatively high interest rates up to 1875, followed by a downward trend reaching a minimum somewhere between 1895 and 1900. Earlier data for Britain and France indicate that the high interest period commenced during the 1850's, and that during the 1830's and 1840's there was another period of fairly low interest rates.

From 1900 to 1913 was a period of rapid rise in all countries. But after the effects of the war had been cleared (say by about 1923) the rise in interest rates was continued, or at any rate maintained, until the early 1930's. Since that date there has been a marked downward tendency, except in France.

To what extent can the above mass of data be summarised into a series of capital-hungry and capital-sated periods, each showing the related group of characteristics postulated at the beginning of the chapter? On the whole, fairly well. We have:

- (1) Capital-hungry period from 1850 to about 1875.
- (2) Capital-sated period from 1875 to about 1900.
- (3) Capital-hungry period from 1900 to 1930.
- (4) Capital-sated period beginning in 1930.

The twenty years prior to 1850 appear also to have



been a capital-sated period, though the evidence is very scanty.¹

The principal exceptions and qualifications which we have to make are as follows :

- (1) The upward movement of the early 1850's was to a large degree determined by the gold discoveries in California and Australia. Whether an upward movement would have occurred without these it is now impossible to say.
- (2) Development in Australia appears to have begun completely out of phase with the above movements, showing a maximum rate of capital inflow in 1886, falling to a minimum in 1910; but in 1930 it was in phase with the rest of the world.
- (3) The terms of trade were in favour of primary production from 1850 to 1880, *i.e.* for five years longer than the period hypothecated.
- (4) British capital exports showed a subsidiary boom period between 1885 and 1890.
- (5) The 1920's, reckoned above as the last decade of the capital-hungry period, were not such in Britain; capital exports were declining throughout this decade, and employment and internal investment were also low; but interest rates were high.
- (6) World commodity prices and terms of trade reached a maximum in 1925, although production and capital movements remained active until 1929.

Subject to the above qualifications, the hypotheses seem to have been on the whole proved. It will be remembered that gold production and interest rates were left out of the theoretical formulation on the

¹ The famous crisis of 1825 may possibly have marked the opening of the capital-sated period. At any rate it is a remarkable coincidence that the interval between this crisis and the Treaty of Vienna (which concluded the Napoleonic wars in 1815) was exactly the same as the interval between the Treaty of Versailles and the crises of 1929.

grounds that empirical data were needed. The facts regarding gold production have been summarised above. Regarding interest rates, the evidence seems to show that during every capital-hungry period they rise, at any rate for the first part of the period, while the latter part of the period they remain stable at a high level. In all the capital-sated periods they fall.

This might appear to be somewhat in conflict with a belief generally held, and summarised in one of the favourite economic wise-cracks of the 1930's (sometimes attributed, without evidence, to Mr. R. G. Hawtrey), namely, that "the rate of interest is a purely monetary phenomenon".

In support of the purely monetary theory of the rate of interest, it may at once be stated that the evidence is clear, both from recent experience and from theoretical reasoning, that the rate of interest does not, in the short period, directly equate the supply and demand of capital. The rate of interest, together with other factors, determines the amount of investment, and each change in the amount of investment sets in motion a series of changes in the level of national income which automatically equates savings to investment. The rate of interest, therefore, has something to do with investment but nothing to do with saving.

All the above is perfectly true provided it is confined within the limits of a trade cycle. In the longer period it ceases to be true. While the precise rôle of the rate of interest in the long-period cannot be formulated, it clearly has a much more intimate relation with the processes of saving and investment in the long-period than it does in the short.

An opinion may next be ventured on the question of the length of these capital-hungry and capital-sated periods. The first two periods lasted for around twenty-five years each (1850 to 1875 and 1875 to 1900). The following period lasted for thirty years (1900 to 1930). How long will the next period last? Though we cannot say so conclusively, it appears fairly clear that prolonga-

tion of the 1900 to 1930 period was due to the war of 1914-18.¹ It must be remembered that although this war caused considerable destruction of capital in Europe, many important parts of the world were scarcely affected by it, while in the U.S.A. the net rate of accumulation of capital for the decade 1910 to 1920 was only slightly reduced (see table on page 92). It appears, therefore, that the destruction of capital in the last war might just about account for a five-years' prolongation of the capital-hungry period. It will be remembered also that by 1925 signs of change were already becoming apparent in the fields of prices and terms of trade, though not in the volume of world trade and investment.

What of the period commencing in 1930? The occurrence within the period of a world war, which lengthened the capital-hungry period of 1900-1930, should have the effect of shortening the capital-sated period, whose normal duration might have been from 1930 to 1955. The final duration and destructiveness of the present war cannot be foreseen, but it shows signs of consuming much greater quantities of material resources and possibly of spreading over a wider area than did the war of 1914-18. Its shortening effect on the long cycle (especially if we take into account the great diversion of resources into armaments production which had already occurred before the war started) may probably be put at ten years instead of five years. This indicates that the capital-hungry period would begin about 1945, or in effect at the conclusion of the present war.

¹ The period 1850-75 included the Crimean, Italian, Prusso-Danish, Austro-Prussian, American Civil and Franco-Prussian wars. This is a striking list, but it is doubtful whether the destruction caused by these wars, in relation to the world's resources at that time, was at all comparable with that of the Napoleonic and 1914-18 wars.

CHAPTER VIII

PROBLEMS OF 1941-60

WHEN the last war finished in 1918, producers were immediately confronted with a dammed-up demand for civilian goods and services of every kind. But the extent of this damming-up was naturally greatest in the case of the more durable commodities, because consumers had been more able to make do with their older stocks. It was greatest of all in the case of the most durable commodity, namely, building.

The consequences of this situation were clear and might have been anticipated at the time. Production was carried on up to maximum capacity, regardless of costs, which rose rapidly. Building costs particularly rose to fantastic heights. As the most urgent of the postponed demands were worked through, the high prices and profits based on the current high levels of marginal cost became no longer supportable and there ensued the rapid and violent depression of 1920-21. Unemployment in 1921 rose to 15·3 per cent of the working population in U.S.A. (National Bureau of Economic Research estimate) and to 2½ millions, or about 13 per cent of the working population, in Great Britain in the same year.

The 1921 depression, though violent, was short-lived. It put a stop to excessively high-cost production, but the basic situation remained favourable. The world was still capital-hungry, as shown in the previous chapter, and by 1923 virtually full employment had been reached in most countries except Great Britain, where there were certain structural maladjustments.

It is inevitable that a similar period of intense productive activity (at comparatively high costs) will follow the present war. The extent of material destruction

and the effects of accumulated deprivations may be greater, thereby indicating the potentiality of a still more violent boom than that of 1919-20. On the other hand, it may be anticipated that some of the worst features of the boom will be restrained by public control.

It seems equally certain that such a boom (which may in this case last for three or four years instead of two) should be followed by a depression. We do not know exactly when the war is going to end, but by the time we have covered the post-war boom and subsequent depression we have brought our anticipations somewhere to the neighbourhood of 1945. This year, as indicated in the previous chapter, should be the turning-point of the long-period cycle. Long-period cycles cannot be relied upon to act punctually to within a year or so, and the possibility is always open that the depression following the post-war boom may be fairly severe and prolonged.¹ But what we can be fairly sure of is that it will be the last of its kind. From the later 1940's onwards the world's capital-hunger will again be paramount and the steady upward trend in world trade, capital movements, employment and prices will have begun. Subsequent depressions will occur, but like the depression of 1907 they will be short-lived and will not, at the worst, involve unemployment on anything like the scale to which we have recently been accustomed. The world will then be free, at any rate till the next capital-sated period is reached, of "chronic" unemployment in the sense that it has known it recently.

It must not be concluded that unemployment will be entirely absent. A certain minimum (or as it is sometimes called, "normal" unemployment) is inevitable owing to the unavoidable intervals between men leaving one job and taking another, and to the seasonality of certain industries. A further persistent factor in unemployment may be "occupational maladjustment",

¹ Unemployment in such a period could, of course, be largely eliminated by the belligerents if they adopt a system of compulsory savings—and withhold the release of these savings till after the post-war boom.

when a surplus of labour is offering in certain occupations, while production in general cannot expand owing to other occupations being at full employment. A further factor is "geographical maladjustment", which has been pronounced in Great Britain during the last twenty years, with a surplus of labour in certain areas and no effective surplus in others.

What level of unemployment is to be anticipated under these circumstances? In Great Britain between 1900 and 1913 unemployment ranged from 2 per cent in the best years to 7 per cent in the lowest phase of the trade cycle. However, the economy of Great Britain during this period was rather peculiar. Its structure was particularly well adjusted to its environment, while being at the same time unprogressive (like the social life of the Eskimo). A fairer basis would probably be the U.S.A. between 1919 and 1929, where the range was between 5 per cent and 15 per cent. The difference corresponds to greater elements of seasonal employment and occupational maladjustments in the U.S.A.; these in turn were (at any rate in part) the inevitable consequence of the rapid industrial progress of that period.

During the capital-hungry period before us we may probably anticipate unemployment averaging about 8 per cent over the trade cycle, and ranging from 5 to 15 per cent in the most complex, advanced and rapidly progressing communities; and unemployment of half that value or less in the simpler or less progressive communities.

There is a certain school of thought in the U.S.A. which fears that that country has become "mature", and will be incapable of expanding economically or even of finding work for the whole of its present bread-winning population. These fears will be rapidly dispelled. There is no need to recapitulate the conclusions reached in previous chapters.

Great Britain and France, on the other hand, will have become, in the economic sense, fully mature countries. By this is meant that, largely owing to the stagnancy of

their population, there will be very little scope for investment within their own economies and virtually the whole of their savings will have to be invested abroad. In both countries savings by 1960 will constitute 11 per cent of the national income, and any interruption to the outward flow of these savings would, with its secondary effects, produce unemployment in Britain and France on a gigantic scale. In the U.S.A. savings will represent a similar proportion of the national income, but out of aggregate savings of 158 milliard I.U. something like 100 milliards will be invested within the country. Thus the U.S.A. will be dependent on foreign investment for full employment, but not so markedly as France and Britain.

Historical evidence from the study of the long-period cycle in the past makes it almost certain that interest rates will rise from their present low levels. There is, of course, nothing easier on the face of it than to keep interest rates down permanently by monetary means (purchase of securities by the banks), but if this policy is pursued some form of capital-rationing will become necessary. Permanently low rates of interest unaccompanied by capital-rationing would lead to such a volume of investment as would force up prices relative to wages, diverting a substantial proportion of the national income from wages to profits and rents, and creating social instability generally. If inflation of prices is carried too far, a stage is reached where saving is discouraged, which is not the right policy for a capital-hungry period.

It is not intended to convey the impression that capital-rationing is undesirable or impossible. The problems associated with large-scale capital-rationing over a long period of peace, however, have not been adequately studied.

It has been implied, without specific mention being made of it, that the principal trading countries of the world will be on a uniform currency basis. The experience of the last two decades has shown us that depreciation of national currencies, whether voluntary or involuntary,

can be a potent cause of international ill-feeling and stimulates retaliatory action through tariffs and quotas.

It must be admitted, of course, that in many cases the pressure to de-value was overwhelming, and that the real fault lay with the violence of the decline of world prices.

Proposals for the creation of a free trade area, and for a uniform currency, are an essential part of the proposals for Federal Union among the democratic countries. With such ideas the present writer is in substantial agreement. But at this stage it need only be emphasised that upon the formation of such a Federation those in charge of economic and currency policy would face an exceedingly grave responsibility. If their policy sets up severe economic strains in any part of the Federation, the nation or nations concerned will be strongly tempted to break with the Federation in order that they may de-value their currency or impose tariffs. Economic maladministration could destroy the whole political solidity of the Federation.

If currencies are to be stabilised, either in such a Federation or in a less far-reaching scheme, the fixing of the initial rates of exchange would be a problem of extreme delicacy. In the first place we have certain countries whose wage and price structure is (or will be) right out of relation to world prices, and therefore find (or will find) necessary an all-round system of tariffs and export subsidies. For such countries the whole problem will be solved if they are able to enter the Federation (or Currency Union) at such a rate of exchange which automatically gives to their industry in general (not, of course, to each industry in particular) the protection required. It must be understood, however, that from that date onwards they would have to keep their internal prices and wages substantially in accord with world prices, because further revaluations could not be considered. At the conclusion of this war, prices and wages will have risen in very different proportions in different countries, and substantial revaluations along

the lines indicated above will be needed. Incidentally it seems fairly clear that a time of disorganised currencies and price-levels such as will follow this war will be the opportunity of a lifetime for establishing, with rapidity and certainty, a Customs and Currency Union.

Once the Currency Union has been formed, the question then to be decided is what long-period price policy is to be pursued. It has been shown that there will be a great change in the terms of trade; is this to represent a decline in the price of industrial goods and a rise in the price of primary products, or stationary prices for industrial goods and a 90 per cent rise in the price of primary products, or are both to rise?

Many nations will have vast accumulations of debt. If their currencies are revalued upon entry into a world Currency Union in the manner indicated above, this will give some relief, but in many cases the debts will remain very high in relation to national incomes. These countries will have a strong claim for a general upward trend of commodity prices, while the comparatively debt-free countries will not have very strong grounds for resisting such a movement.

A long-period upward movement of general commodity prices is undesirable when it begins to effect really substantial redistributions of wealth between different economic classes, and may cause grave injustice to pensioners and others dependent upon small fixed incomes. If, however (as we have assumed), the rentier and fixed-income classes are receiving the benefit of a rising rate of interest, they will have less justification in resisting a gradual rise in commodity prices. A rise in the general price-level comparable to that between 1900 and 1913, of about $1\frac{1}{2}$ per cent per annum, would seem not to be intolerable.

One consequence of this state of affairs would be a fairly rapid decline in gold production. This is desirable, because the mining of gold is a waste of labour which could be devoted to the production of much more useful things. The only requisite is not to make the decline

so rapid as to cause undue distress to those at present engaged in the industry. It is anticipated that those in charge of currency affairs will be able to reduce progressively the requirements of gold for currency purposes until eventually its use for currency disappears altogether. The releasing of vast stocks of gold from the world's dungeons will give an entirely new impetus to the metal-worker's art.

It will be apparent to the reader, however, that the whole equilibrium depends on the economic development of the Asiatic countries, particularly India and China, and their emergence as consumers of foodstuffs and importers of capital. Asia, it is estimated above, will absorb a capital inflow of 159 milliard I.U. between 1945 and 1960. No doubt there will be many demands on the part of real or supposed sectional interests to impede this flow. But those who do so should consider that, even if they ignore the effects on the Asiatic countries, the turning back of this vast stream of potential savings into Europe and America will promote unemployment and trade depression on a scale that scarcely bears contemplation.

This flow can only take place when political stability has been obtained in all the principal Asiatic countries. This phrase "political stability" means nothing more than it says, but unfortunately it conjures up imaginations of big European and American financial interests, backed by the armed forces of their Governments, interfering in the political and social affairs of Asiatic countries. Historical evidence of such happenings in previous active periods of international investment is unfortunately only too abundant. That such things should occur is an intolerable evil. The world's problem *par excellence* is going to be to arrange for the free international and inter-continental transfer of goods and capital, without giving any one nation occasion or pretext to interfere in the government of another. Europe and America must admit to the Asiatics the same right that they claim for themselves, namely, to have that

form of government and social and economic structure which they themselves choose. In borrowing money and paying interest upon it, even at a comparatively low rate, they are conferring a favour upon us just as much as we are conferring a favour upon them.

It appears that our best chance of successfully organising this great flow of capital from Europe and America to Asia, and of avoiding the abuses and economic imperialism of the past, will be if the bulk of the capital-flow takes the form, not of formation of companies controlled by foreign capital, but of borrowings by Governments — national, provincial or local. A large part of Asia's capital requirements will be for public utilities and for similar investments which can be made under Government auspices. Asiatic Governments might even re-lend, within their own territories, imported capital for the development of private industry.

In this way the full sovereignty and autonomy of the borrowing countries would be preserved. It would be lost if foreign-controlled companies obtained too great a share in their economic life. There should be no serious cause of dispute between European and American lenders on the one hand, and borrowing Governments on the other, provided that the three following conditions (each one of which is of extreme importance) are observed :

- (i) Europe and America are willing to accept a large flow of Asiatic exports of manufactured goods.
- (ii) Interest rates remain fairly low.
- (iii) The world market is not subjected to violent fluctuations of prices or volume.

If a Federal Union of Democracies is formed, as discussed above, such a Union should not only provide for free trade and uniform currency as between its own members, but should be so organised, in fact as well as in word, to provide for the admission of other nations as rapidly as is possible, and to provide for free trading relations with those outside the Federation. If such a

Federation is organised with a high tariff wall around it against the Asiatic and other countries outside, not only will this do grave injustice to the producer of primary products and capital goods within the Federation and to consumers of them outside, but by blocking the progress of other countries it will be setting the stage for the greatest economic and political explosion which the world has ever seen.

There will be some who will say that the future foreseen in this book will never come to pass, because the forces of economic nationalism will continue to dominate the world for many generations to come. What is nowadays called "economic nationalism" is really nothing more than a diseased growth of national consciousness, one form of that race-worship which serves as a religion to so many millions of people today. I believe that, in its worst manifestations, it is destined to disappear.

Those who strive to isolate their country as far as possible from depending on foreign commerce, in a mistaken belief that they are thus conserving its best traditions, are mistaken. Let any such turn back to the *Carta Mercatoria* of Edward I, proclaimed in the year 1303 :

Edwardus Dei gratia Rex Angliæ, Dominus Hiberniæ, dux Aquitaniæ, Archiepiscopis, Episcopis, Abbatibus, Prioribus, Comitibus, Baronibus, Justitiariis, Vicecomitibus, præpositis, ministris, & omnibus ballivis & fidelibus suis salutem. Circa bonum statum omnium mercatorum subscriptorum regnorum, terrarum, & provinciarum, videlicet Alemanniæ, Franciæ, Hispaniæ, Portugalliæ, Navarræ, Lombardiæ, Thuscæ, Provincie, Cataloniæ, ducatus nostri Aquitaniæ, Tholosaniæ, Caturuni, Flandriæ, Brabantiæ, & omnium aliarum terrarum & locorum extraneorum, quocunque nomine censeantur, venientium in regnum nostrum Angliæ & ibidem conversantium nos præcipua cura sollicitat . . .

Inprimis videlicet quod omnes mercatores dictorum regnorum & terrarum salvè & secure sub tuitione & protectione nostra in dictum regnum nostrum Angliæ, & ubique infra potestatem nostram alibi veniant cum mercandis suis quibuscunque, de muragio, pontagio & pannagio liberi & quieti. Quodque infra

idem regnum & potestatem nostram in civitatibus, burgis, & villis mercatoriis possunt mercari duntaxat in grosso tam cum indigenis seu incolis ejusdem regni & potestatis nostræ prædictæ, quàm cum alienigenis, extraneis, vel privatis. Ita tamen quod merces, quæ vulgariter merceriaræ vocantur, ac species, minutatim vendi possint, prout antea fieri consuevit.

[Edward, by the grace of God, King of England, Lord of Ireland, Duke of Aquitaine, to his Archbishops, Bishops, Abbots, Priors, Earls, Barons, Justices, Sheriffs, governors, officers, all bailiffs, and to all his faithful people, sends greeting. Whereas we have a particular care for the well-being of all the merchants of the kingdoms, lands and provinces following, to wit, Germany, France, Spain, Portugal, Navarre, Lombardy, Tuscany, Provence, Catalonia, our duchy of Aquitaine, Toulouse, Châlonnais, Flanders, Brabant, and all other foreign lands and places whatever coming to our Kingdom of England and doing business there . . .

Be it known in the first place that all merchants of these lands and kingdoms may safely and securely under our protection enter and bring any merchandise whatsoever into this our Kingdom of England and all our other Dominions free from wharfage, bridge tolls, or primage. And that they may trade (but only at wholesale) in all cities, boroughs and market towns of this our Realm and Dominion alike with our subjects and residents, with foreign subjects, strangers or with private persons. Be it so however that they may also trade at retail in those goods commonly known as "mercery" and in spices, according to established custom.]

Other clauses provide that contracts are not on any account to be repudiated after the token payment ("God's penny") has been made and received, that the price for goods commandeered for the King's service shall be determined by an independent person and not by the King's officers, that officials who cause delays to foreign merchants shall be punished, and that in the case of trials of merchants half the jury shall be merchants of their own nationality. (How many modern potentates give such generous treatment to foreign merchants?) The Charter also provides for uniformity of weights and measures throughout the Kingdom, and appoints a special Judge before whom merchants' cases can be heard without delay and sums due to them recovered,

if the ordinary Courts "eis non facerent de die in diem celeris justitiæ complementum" (do not settle the merchants' business fully quickly and justly from day to day). A final clause imposes Customs Duties for the King's revenue, but with so little thought of "protection" for home producers that they are imposed on imports and exports alike "tres denarios de libra in introitu rerum et mercandis in regnum et potestatem nostrum . . . et similiter tres denarios de qualibet libra argenti in eductione quarumcunque rerum et mercandis hujusmodi emptarum in regno et potestate nostris" (threepence in the pound on importation of goods and merchandise into our realm and dominions . . . and in like manner threepence on each pound¹ of value of all exported goods and merchandise purchased within our realm and dominions) in addition to certain pre-existent customs duties. These *ad valorem* duties were imposed on general merchandise, together with specific duties on imports of wine, and on exports of wool, hides, sheepskins, dyed cloth and copper.

There is still much that we can profitably study in this Charter of Edward, the noblest of the English kings, who promulgated this sane and generous Charter centuries before the blight of Mercantilism descended upon economic thinking. We can learn a genuine internationalism, whereby honest merchants of other kingdoms may trade with the same freedom as his own subjects. Without detracting from this principle, however, he lays down the further principle that retail trade is a right matter for regulation by the national or local authority and that unrestricted freedom of trade in this sphere cannot always be permitted. (In the same category may be placed all those secondary and tertiary industries whose products must, by their nature, be produced and consumed in the same area, and are not the subject of international or inter-regional trade.) In respect of the other provisions of the Charter, we may indeed also view them in contrast with our present-day

¹ Literally "pound weight of silver", the origin of the modern "pound".

custom of "cancelling" contracts, which contributes so greatly to the instability of business conditions, and the delays and expense of the law, which are bound to have the effect of favouring the rich and the unscrupulous.

The King's essential principle remains as a guide to the modern world, namely, that in the trade of goods at wholesale there should be no differentiation against any merchant or producer on the grounds of his nationality, but that each authority has the right to control those goods and services which are produced and consumed within its own borders.

THE END



